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THE ISLAND of Santo Domingo, in the West Indies, is becoming the scene of some mining activity. In the San Cristobal district there have been found copper deposits large enough to warrant the erection of a smelter having a capacity of 50 tons per day. It is expected that the first matte ever shipped from the island to the United States will reach New York city early next January. A railroad is in course of completion from the port of Santo Domingo to San Cristobal and the mining camp of San Francisco; this will stimulate further exploration, not for copper alone, but for gold also. It is said that labor is cheap and abundant; the country is healthy and well-timbered.

THE REDUCTION of one-half in the dividend rate on the common stock of the United States Steel Corporation, which was noted in our columns last week, appears to be sound finance. Under present conditions it would be hardly good policy for the company to pay out money which has been earned indeed, but which may be needed to support the current reserves. At the same time it has rather an unfavorable influence upon the market, although it is really only a recognition of the fact that the boom in the iron trade is declining, and that we are approaching a period of less active demand and of lower prices. After all, this fact has been clearly recognized by most observers in the trade and has been more than fully discounted in the stock market, so that the action on the dividend should have but little effect. Nevertheless, the common stock of the corporation this week reached its lowest record, selling at 12½, or $12.50 per share of $100, par value.

SHIPMENTS OF iron ore from the Lake Superior region in September were light, the total reported being 2,946,639 tons, which is 710,441 tons less than in the corresponding month last year. The total shipments up to October 1 are reported at 19,376,493 long tons, which is 1,332,117 tons less than at the same date in 1902. Under these circumstances, it looks very much as though the total for the year would hardly reach 25,000,000 tons. The large stocks in furnace yards, and the crowding of the Lake Erie docks, coupled with the proposed reduction of output at the blast furnaces, is responsible for this decrease, which seems to be a further admission on the part of large shippers of the declining demand in the iron trade.

THE AFFAIRS OF the Etruscan Copper Estates have added to the chronicles of mining at least one seriocomic chapter. These old mines, in Italy, were examined by three engineers of the first rank, namely, C. Algernon Moreing, R. J. Frecheville and Edgar P. Rathbone. All of them arrived at the decision that they did not afford the basis for a profitable enterprise. In spite of these opinions the company was formed and the directors made strong statements as to its earning powers; they quoted the reports of other less authoritative engineers whom they sent to examine the mine, and matters went so far in this direction that, last March, the chairman of the company not only gave an estimate of $1,000,000 profits per annum, but also foreshadowed a dividend within the year. Setting aside the views of experienced men, the chairman and his co-directors went to the property, gave their own description of it and based confident forecasts upon such data. Now it looks as if the inevitable sequel was about to happen; the shares have dropped from £2 15s. to 16s., about $2,000,000 has been spent without any prospect of a dividend, and the amateur directors are at the mine trying to find out just how they made such a muddle. The moral seems to be that when people play the fool they should not expect miracles to happen, and that either there is no such thing as expert knowledge, or, if there is, it is incumbent upon business men to make proper use of it. Selah.

A CABLE FROM London announces that the Government of the Straits Settlement has issued an order prohibiting further import of dollars into the colony. This is, of course, the preliminary step to placing the currency of the Straits upon a gold basis, which was agreed upon some time ago. The plan proposed is to prohibit, as soon as possible, the further currency of Mexico and Bombay dollars and to coin a special dollar for the Straits, which it is proposed to maintain at a par of 2s.—or 48c.—by making it exchangeable for gold when presented at the mints. The preliminary step, by limiting the present currency until the new coins appear, is expected to maintain the exchange value of the dollar at the point indicated. The difficulty is that, in anticipation of such an order, local traders and banking houses have been importing a very large quantity of Mexican dollars, and the banks at Singapore are now loaded with these coins. It is con-

sidered quite probable, however, that in view of this situation the Straits' authorities will receive these dollars for re-coinage, instead of buying bar silver for that purpose. Should such a decision be reached, it will relieve the situation. It is in view of these facts that the premium on Mexican dollars, which has existed for a long time in the London market, has disappeared, and those coins are now selling at their bullion value.

IT IS IMPORTANT to note that while there has been a large increase in the consumption of lead in the United States during the last three years, the production of domestic mines remains at a standstill at about 280,000 tons. The additional quantity required by the home demand has not been, as might have been supposed, supplied by lead from Mexico and other foreign ores smelted and refined in this country. This lead, which is refined here in bond, has been almost entirely re-exported, the entries for consumption at home having been very small. The fact is that three years ago production had considerably outrun the demand then current, and the stocks carried by producers were very heavy. The increased demand has enabled producers to work off these stocks, and to reduce their holdings to normal amount, so that, at the present time, they are really low. The increase in consumption during the last three years has come partly from the great activity in building operations, which has required the use of large quantities of lead, partly from the increase in the demand for sheet lead for insulating cables and similar electric work, and partly from the demand for lead for use in various alloys.

The production of red lead, litharge and orange mineral has shown no very important increase during the last three years; nor has the production of white lead, although there was a considerable increase in the make in 1902. White lead has certainly suffered from the competition of other white pigments. If the improved Dutch processes, that are now attracting so much attention, result in such a decrease in the cost of manufacture as is anticipated, white lead may be able to regain its lost ground.

CALIFORNIA MINERAL PRODUCTION.

On another page we give statistics of the total mineral product of California for the year 1902, from official sources. The total for all the products is given at $35,069,105, which is a good showing, and about $700,000 more than for the previous year. The relative value of the principal products is: 1, gold; 2, petroleum; 3, copper; 4, borax; 5, clay products; 6, quicksilver, and 7, silver.

Three of the counties of the State show a product for the year of over three million dollars each, two over two million and five over one million dollars. Out of a total of 57 counties in the State, 54 made some mineral production last year, which is an excellent record for a State in which mining has been carried on for so many years. Gold is mined in 35 counties and silver is produced in 27 counties, mainly with the gold.

The gold yield is $16,910,320, which shows a slight falling off; but the gold production of the State fluctuates from year to year in accordance with the character of the season, some seasons being dry, with scant supply of water for mining. With good water-supply the gold yield is always larger. There were 44 mineral substances mined in 1902, and in 54 counties, as stated. The petroleum product was over 14,000,000 barrels for the year, but in the valley counties the prices were low—say 20c. a barrel—so that the valuation does not come up to what was expected. In those counties having both sea and rail transport better prices are realized than where railroads alone can control the freight to point of consumption. For example, Ventura county, with an outlet by sea, got $455,000 for its 475,000 barrels of oil; while Kern county, in the valley of the San Joaquin, and dependent on rail alone, only got $1,955,585 for 9,777,948 barrels of its oil. This is a matter of interest to investors in California oil stocks.

Quicksilver shows an increase in number of flasks of nearly 3,000, but the total valuation is less than the previous year.

There is an apparent increase in structural materials which shows that more of them are being utilized than formerly. The output of borax also shows a decided increase. Practically all the borax of the United States comes from California, and it is the same with quicksilver, for, with the exception of some from Texas, California yields it all.

The wide distribution of minerals in the State is worthy of note. Thirty-five counties yield gold; 27 yield silver; 19, mineral waters; 18, copper; 13, quarry rubble, and 11, macadam; 10 produce granite and nine asphalt, lime and quicksilver, while other products come from a long list of counties. These substances are known to exist in other counties, but only those are considered which made a product in 1902.

The California State mineralogist shows commendable zeal in thus setting forth annually the result of the work of the miners in his State, a complete record being kept of all engaged in the business of mining and quarrying.

GEOLOGICAL PROBLEMS ON THE RAND.

On another page we publish a discussion of the origin of the gold-bearing conglomerate on the Rand, contributed by a writer at Johannesburg, who reviews the conclusions of Professor De Launay appearing in our issue of April 4. The subject has come again to the front quite recently, especially in South Africa, by reason of a controversy started by Mr. G. A. Denny, who, in discussing a paper by Mr. J. S. Curtis, made the statement that he had determined the shales underlying the Main Reef series to be of igneous origin. These shales, known as the Hospital Hill series, form the footwall of the quartzitic beds inclosing the 'banket' of the productive mines, and, naturally, a dispute between their sedimentary and igneous origin goes to the heart of the problem presented by the occurrence of those remarkably persistent layers of gold-bearing conglomerate, which have made the Witwatersrand the greatest gold-field in history. The burden of proof is undoubtedly upon Mr. Denny, and we cannot see how the question can be settled without appeal to the microscope. For this reason we will publish shortly a paper by Dr. Frederick H. Hatch, a high authority on South African geology, because he gives the testimony of a large number of thin sections which he has examined carefully.

We shall not be sorry, however, if Mr. Denny's startling statement revives the very interesting discussion upon the origin of the banket. This still remains the great riddle of modern economic geology. The chief point at issue is whether the gold shared the sedimentary origin of the pebbles of conglomerate, or whether its presence is due to subsequent infiltration—in brief, is the gold of mechanical or chemical origin, placer gold or vein gold?

Professor De Launay formerly maintained that the sea in which the banket was laid down was a saturated solution of gold and pyrite; but he has abandoned this far-fetched theory, and when he recently re-weighed the evidence now available, he exhibited great caution, concluding with a decision equivalent to the Scotch verdict of "Not Proven." Mr. Geo. F. Becker, in an admirable treatise published in 1897, enunciated the theory that the conglomerates represent a marine placer, the gold itself being of similar origin. The presence of crystallized gold and pyrite is explained by later re-crystallization from solutions which circulated through the conglomerate beds, and the rarity of pebbles showing visible gold is compared to a parallel experience in the river gravels of California and Venezuela. Mr. Curtis, in August of this year, reiterated his own view, which is shared by the large proportion of mining engineers in the Transvaal, that the gold was deposited by solutions long subsequent to the formation of the rocks in which it is now found; Mr. Denny argued for the detrital origin of the gold and a deposition contemporaneous with that of the conglomerate, while Dr. Hatch supported the infiltration theory, although disagreeing with Mr. Curtis' use of "lateral secretion" as a factor.

We also publish a timely article by Mr. T. Lane Carter, describing recent work in the Heidelberg mining district where the Hospital Hill shales form an important feature in the structural geology. It will be noticed that Mr. Kuntz, in the letter we publish, refers to the Hospital Hill series as ferruginous shales of a marked character, affording valuable guidance in the deciphering of the local geology. He brings forward a number of observations of no little interest, and we hope that others among our readers in the Transvaal will contribute data so that the matter may be discussed in these pages. For the present we will defer our own views on this fascinating problem.

ORE STEALING AND CHANGING-HOUSES.

The Chamber of Mines of Western Australia has taken official cognizance of the theft of gold ore, amalgam and other valuable products of the mines, especially at Kalgoorlie, where "specimen ore" is frequently encountered in the course of working. Despite special legislation recently enacted, the curtailment of gold dealers' licenses, the system of change-houses for the miners, and other precautions, it appears that an illicit trade is still kept up vigorously and large shipments of gold are made through the banks which there is no doubt are derived from this source. Many offenders have been arrested and prosecuted, but conviction has failed in several cases by reason of legal technicalities.

Other gold mining districts are having a similar experience. At Cripple Creek the unusual concentration of value in telluride ores of great richness has stimulated stealing on a large scale, and in the Telluride-Ouray region mine-owners have always had a difficult task to prevent pilfering underground. Other localities, in California, Nevada and Arizona, have suffered similarly, and in some cases it has diminished the profits of mining to such an extent as to discourage development.

At the bottom of the business—and in some camps it is a widespread organized trade—there is a notion that it is not as wrong to steal ore as it is to rob a till; and, added to this twist of thought, there is an idea that the owners of mines are rich capitalists who will not miss the amount stolen, or, if they do, no matter. Thinly veiled socialistic theories concerning the rights of property, emanating from ignorant politicians, have filtered down to the working miners and other laborers until it has been held excusable even among the better sort to retain a part of the products which otherwise would go out of the State to the rich men who own the mines. Of course this is a hopeless fallacy, for the mine

owners are often poor shareholders, poorer than the miners who earn $75 to $100 per month, and the gold in the ore is no more the property of the miner than the watch in his partner's pocket.

But considerations such as these are of no effect. In Cripple Creek a man who was caught in the act was released on the theory that the ore was part of the real estate, and that therefore he could not be held for larceny. Three men arrested with ore in their possession got away on the plea that it was a conspiracy of the management to entrap them. It is difficult to convict because there is a loose sort of public sympathy which sets the supposedly poor miner in balance with a supposedly rich impersonal company. Further, there are always a lot of people who profit by the trade in stolen ore, and evidence is hard to get, because workmen who themselves are too honest to pilfer will yet hesitate to testify against their mates. So the legal technicalities, sloppy sentiment and general public inertia unite in permitting a disreputable trade to flourish, to the injury of property and the debauching of the moral tone of the community.

While undoubtedly a healthy recognition of the laws of *meum* and *tuum* and the inculcation of honesty as the first of the manly virtues would be the most effectual antidote to the condition of affairs obtaining in most gold mining districts, it is obvious that the most practical thing to do is to make ore stealing difficult. Of all precautions, a well-arranged changing-house is probably the most effectual. On the score of humanity alone every mine should provide a house where the men, on coming up from underground, can change their clothes and get either a wash or a bath. If this is done systematically, it will conduce to the general health of the men and to a decrease in ore stealing. By having one room for working garments and another for street clothes, by requiring the men to submit to examination in their passage from one room to the other, it is possible to cut down ore stealing to a minimum, and at the same time to emphasize a proper regard for health; change of garments and washing are helpful, but it is also well to prevent men heated by labor and the warm air of the mine from passing at once into the cold which obtains in so many mountainous regions, and is encountered, nearly always, by night, at the change of shift even in warm climates.

In a recent issue we published the drawings of a new changing-house erected at an iron mine. At precious-metal mines an addition would be needed in order to put into effect the plan outlined above, but the further expense would be insignificant compared to the results to be obtained. The well-being of the employed is one of the first duties of a manager, and when it coincides with the effort to put a stop to practices which are ruinous to the operations of the mine, it is obvious that no other inducement is needed to prompt him to give proper consideration to the matter. It would serve a useful purpose if those of our readers who have considered this matter and are connected with mines where such facilities exist would state their experience, giving data which may prove suggestive to their professional brethren.

MARKET CONDITIONS.

October 14.

The metal markets are, for the most part, quiet, the still unsettled state of affairs in Wall Street, and the depression in the iron market being reflected in this quarter to some extent.

Copper shows little change, although orders for exports still continue to come in, but there is no material alteration in prices.

Tin remains unsettled, with some variation in quotations, and comparatively moderate business.

Lead continues to show more demand than most of the other metals. Deliveries are somewhat better to consumers.

Spelter is somewhat stronger, with no material alteration from last week. In the Joplin ore market, prices for ores are somewhat lower, a fall of $1 or more being reported. The Missouri & Kansas Zinc Miners' Association, in order to counteract this movement, is proposed to arrange for exports of ores, but previous experiments in this direction are not very encouraging.

Silver shows little change. The expected purchases of silver for Indian coinage have not yet been actually made. The action of the Government of the Straits Settlements, in prohibiting further importation of Mexican and other dollars, is referred to elsewhere. The large surplus of dollars now held in the colony may be sufficient, if re-coined for the new currency, to prevent buying of bar silver from that quarter.

In the iron market, conditions show little change, and purchasers are still holding back. What buying is reported, is chiefly in moderate amounts for immediate delivery, and it is a notable fact that there is no longer anywhere any trouble in securing short deliveries from furnaces and mills. Consumers are evidently of the opinion that further concessions will be made, and are naturally still holding back, until they think the bottom has been reached. When this will happen it is difficult to say. The movement to restrict production of pig iron is making progress, both in the Central West and in Southern territory. The Southern railroads have granted the reduction of 50c. per ton in rates on iron, which they at first refused. This gives furnaces some advantage in the competition for business.

In the Western coal trade a reduced demand from furnaces and factories, both for coal and coke, is reported. This, however, is due in part to the fact that many manufacturers have laid in stocks sufficient to last them for some time. The Lake trade is rather slow. Vessels are abundant, but there is a congestion on the docks at the upper lake ports, while there is also a shortage of cars in the railroads running from those ports. The movement, however, has been very large so far, and there will probably be little difficulty in placing sufficient supplies by the end of the season. Some complaint is made in the West of a shortage of cars, but the difficulty does not appear to be serious.

The report is renewed that the miners in the Connelsville region, who have for years worked under a separate agreement, are to be organized and to join the United Mine Workers of America. This report, however, seems to be based on expectation, rather than on any actual occurrence. The Alabama miners for the first time in two years have had a reduction in the mining rate, varying from 2½ to 5 cents a ton, owing to the lower prices of pig iron which forms the basis of the mining prices.

The Atlantic Seaboard bituminous trade continues very quiet, and the anticipated improvement in demand seems a long time coming. The statement given out by the press that leading producers had resolved to cut prices 50 cents a ton does not really affect prices much, since coal has been selling for weeks far below the schedule price.

In the anthracite trade demand shows a slight improvement, but in general trade conditions are quiet, and no great increase in buying is expected until really cold weather is nearer.

Electrons in orbital motion have been shown to constitute the mechanism by which atoms are able to radiate light.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

The use of aluminum where it is exposed to the action of salt water, even when covered with a protective coating, is impracticable, owing to the extent of corrosion.

In crushing materials required for cement manufacture, fine grinding is required. Heretofore, in the United States, centrifugal roller-mills of the Griffin type have been commonly used in the best practice, but lately the application of ball-mills for intermediate grinding, followed by tube-mills, for the final grinding, has been successfully made, and a good many of the latest plants have been equipped in that manner.

Roll shells of forged steel cost 8 to 10c. per lb., and may give a service of crushing approximately 40,000 tons of ore. Roll shells of chilled cast-iron cost only 2.5 to 3c. per pound, but their service is only approximately 5,000 tons of ore. Forged steel is therefore the cheaper per ton of ore crushed.

Chutes for conveying fine, dry ore in a crushing mill should not be given a less inclination than 45°; it is preferable to give them an inclination of 50°, if possible. These angles are measured from the horizontal. The hoppers of screens sifting fine dry ore should have a slope of 55° on their sides in order to insure a good discharge of the ore without accumulations in the angles, where the slope is less than on the sides.

Rolling mill practice indicates plainly that the requisite power for rolling any piece of iron is a function of the mass to be rolled, the reduction of the section, the temperature, and also in all probability the analysis of the material and the shape of the section. There are not many data in engineering literature as to the design and construction of roll-trains and the determination of power for rolling iron and steel. Louis Katona recently contributed a paper on this subject to the *Transactions* of the American Institute of Mining Engineers, which may well be consulted.

Three men will feed 200 tons of lump ore to a breaker in 10 hours, or one man per 66 2-3 tons of ore, if none of the ore be in such lumps as to require sledging; if the jaws of the crusher be flush with the feed floor; if the feed floor be properly covered with ¼-in. steel plate, and if the ore be dumped close to the mouth of the crusher. In breaking ore by means of hammers, a skillful laborer will reduce 7 tons of ore to 2½-in. size in 10 hours, taking coarse and fine as it comes.

The Blake rock-breaker was first patented in 1858. The United States patent was extended in 1872 for seven years, and expired in 1879, since which time the invention has been used free of royalty in all parts of the world. In its essential features the breaker remains to-day substantially as Eli Whitney Blake, the inventor, originally designed it. The Blake breaker was one of the great inventions of the nineteenth century. It was computed that in 10 years' time, prior to 1872, the direct saving of labor expense by 509 machines was not less than $55,560,000. Since that time the saving must have been enormously greater. By saving in this connection is meant the difference in cost between the work done by the breakers and doing the same work by hand, although it would have been impossible to do the same work by hand because it would have cost so much that there would have been no market for it.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

RELATION OF ROCK SEGREGATION TO ORE DEPOSITION.

The Editor:

Sir.—On reading Mr. Spurr's article, published under the above title in your issue of July 11, any miner looking by instinct for the economical issue, would be prompted to ask the nature of the "favorable conditions" which he must look for to find these segregations.

The word "segregation" has no reference to any definite process, but has been found by geologists to be an excellent one to cover all sorts, shapes and sizes of irregularities in the character of igneous rocks, the origin of which nobody has ever properly explained.

Prof. Kemp, in his "Ore Deposits" (page 60), sums up our knowledge of silicious segregation as follows: "Students of rocks have very generally reached the conclusion that a great parent magma which stands molten for long periods in the earth will break up into different components or fractional magmas before any mineral crystallizes. The fractional magmas by successive eruptions afford various different types of rocks of greatly contrasted composition. The process is called differentiation, and is of interest in this connection as showing in a general way the tendency of fused rocks to break up and vary."

As to the cause of this "differentiation," Prof. Kemp does not give much credit to the theory that osmotic pressure, induced by difference of temperature, could be sufficient; on the other hand he leans toward Mr. G. F. Becker's theory that fractional crystallization of pyrrhotite, for a base and therefore very fluid magma, on the cool walls could be carried on, by continual replacement of the magma next the contact, in virtue of currents induced by differences of temperature in it.

It may also be taken as accepted that part of the molecular change accompanying crystallization is the liberation from molecular control of certain more volatile materials which, in virtue of the free pressure which they assume on the consolidation of the last and most silicious components of the rock, tend to flow toward regions of lower pressure. Such actions are actually observable, for example, on the solidification of water or silver. These and a few of still less importance, as general phenomena of rock segregation, are, however, very special cases: the resulting segregations form a very small proportion of the rock mass and are thus important as rich mineral concentrations, but give no clue to the more general segregations of igneous magmas which are thought to take place.

Aside from variations in coarseness of texture and some slight accompanying difference of composition which may easily be accounted for by such accidental factors as allow of super-saturation in a cooling solution, portions of unmetamorphosed granitic intrusions of any degree of size greater than that of the individual crystals are remarkably homogeneous. In other words, hornblendite, alaskite and other silicious segregations are invariably associated with metamorphic rocks and are very generally due, I contend, to pressure-metamorphism in semi-liquid magmas.

When a magma first starts to crystallize, the small crystals remain in suspension in the magma and flow with it in any direction, since the magma is apparently either too viscous or too full of convection currents to allow the crystals to settle or flocculate unless they are of large size and density.

As crystallization proceeds, however, a stage is reached when the magma becomes plastic and no longer obeys the laws of a liquid. The interstices will then contain something under 50 per cent of fluid, and, as long as the stresses in the mass of plastoid are all of a fluid or normal character, no segregation will take place; but lateral or shearing stresses, if sufficiently great, will tend to induce a redistribution of the fluid, and in cases of shearing strain carried beyond rupture limits—which will not be high—segregation will take place along planes of fracture. The segregated quartz-veins or lenses of many gneisses and schists may thus be explained without any theory based on water-carried material.

Lord Kelvin has shown that, in order to account for the absence of tidal action in the earth itself, it must be considered as rigid at least half-way to its center. Taking into account the great surface movements which indicate the presence of all sorts of indirect stresses in this thick crust—which either is or has been a plastoid—and the occurrence of lava-flows which indicate the presence of regions of low pressure, it is an easy matter to account for the differences between the various igneous rocks, which are forced to the surface of the same region at different geological periods, on the hypothesis I have mentioned.

While I consider this plastic metamorphism will be found to accompany and to be an indicator of the regions of quartz or aplitic segregations, I also believe that they form only preliminary concentrations of the precious metals, which in their virgin form will never be worked for the precious metals; at any rate, I know of no examples which have the least chance of becoming economically important.

BLAMEY STEVENS.

Valdez, Alaska, Aug. 18, 1903.

CARD SYSTEMS FOR MINE ACCOUNTS.

The Editor:

Sir.—The use of card systems in multitudinous variation in almost every line of business except mining has now become a recognized essential to proper accounting. We have books of great value explaining in detail the application of such systems to factory costs and to classification and summarizing of expenditures in mercantile houses; the keeping of records in accessible form for practical business purposes by banks, trust companies, insurance companies, libraries, physicians, dentists, mercantile agencies, real estate agents, telephone and telegraph companies, gas companies, attorneys, collection agencies, manufacturers, railroads, churches, architects, hotels, publishers, societies and almost every conceivable class of industries, except those connected with mining and metallurgic practice.

There are some important mining companies, smelting works and mining engineers, that have taken advantage of the ready supply of filing cases and card stock in the market to make more or less desultory attempts to improve upon the common slipshod and ineffectual modes of accounting which prevail in these departments. That this practice has not become general is attested by the experience of the writer in consultation on the subject of mine accounts, and very recently by the reading of a paper by Mr. F. W. Denton, which was published in this JOURNAL, September 26, 1903, p. 471.*

Without desiring in any manner to detract from Mr. Denton's paper, I merely wish to refer to it as proof that the mining fraternity is far and away behind the times in failing to adopt modern approved methods in the counting house and about the works generally. For there is nothing different in the forms and uses outlined in that paper from what are ordinarily in operation at thousands of well-regulated commercial establishments not engaged in mining. That the method is new to mining men may be inferred from the fact that the present writer has never run across it in such cases, except where he has himself instituted it, always with gratifying results.

*"A Card System for Mine Supply Accounts." By F. W. Denton. Paper read before the Lake Superior Mining Institute, August, 1903.

There are features of Mr. Denton's paper which further illustrate what I have found to be the most stubborn prejudice to overcome in installing such systems at the mines. This is the inability to understand how a method which records the minutest details can be made really to save labor and time in actual use. Our author is evidently not aware that the plan adopted at the Baltic mine for supply accounts is but the simple beginning of reform, nor does he appear to realize that his method of writing up the records is but a slight improvement upon the wasteful methods of the majority under the ordinary system (?).

After a number of years of successful employment of the classified card principle, not only with supply accounts, but with pay-rolls, assays, surveys, the details of mine work, mill work and all other branches of the business, I do not hesitate to say that it provides fully for every detail in such manner as to effect remarkable economy in time, cost and labor, at the same time insuring accuracy, proper checks upon individuals, and, above all, the placing of the accounts in a form to be serviceable as truthful exponents of profit and loss, readily understandable by manager and directors without the aid of expert accountants as interpreters.

The plan given by Mr. Denton does not appear to economize time materially over the ordinary method, although he deems it necessary to emphasize the point that it is no less prompt in operation. Here again I have found great difficulty at the start in convincing old accountants of a thoroughly proved fact, that the records can be so entered as to save time abundantly, and so as to do away entirely with the later work of "writing up." My strict injunction with all card systems, in practice, is "*do it now.*" This gives the day's own record a completed character, which has untold value in ways only to be appreciated from actual experience. Every night the supervising officer on the ground thus possesses means of checking expenditure at any point or at all points. It is a wonderful incentive to high ideals, a certain assurance of prompt detection of error and inefficient service, and it breeds habits of economy and devotion to company interests.

In the Baltic case, Mr. Denton uses the card in connection with memorandum books. They thus become a mere adjunct to the old method instead of a short-cut method in themselves. My plan is very different. In general outline, this is the *motif.* Each and every officer of record, be he foreman, timekeeper, supply clerk or other agent, whether receiver, distributor, consumer or producer, is supplied with cards adapted to his work, and each records his own data without knowledge in common. Some provision is made to check the report of one by that of another. Daily reports are filed at the office, from every department, *on forms especially prepared to epitomize or classify the day's business.* In the office a set of forms is provided to take up summaries of each day's report, on sheets with columns for each summary account, and horizontal numbered lines from 1 to 31. The simple adding of the columns gives totals for each account for the month, or for any minor period, if desired at any time. Columns are provided for values by day and by month, and *everything* relating to the business for the month is in the hands of the accountant on the last day of the month. The manager has available each night a correct replica of the day's business, and can readily strike leaks and lapses at once. Moreover, the whole of the month's business is registered in convenient form for immediate transmission to the home office. This is not a theoretical statement, but one verified thoroughly in my own practice to the full satisfaction of all, from directors and shareholders down to the humblest employee at the mines.

One point must be made perfectly clear, and that is all that space will now allow. The one secret of success in this line is to substitute forms for clerks. The old system of accounting employs cumbersome books of record, arranged only by the dates or page

numbers, requiring an index or a system of back references. The modern plan here advocated classifies all items immediately, making well-devised forms and self-indexing appliances replace clerk hire, in large measure. By this method, properly handled, I have been able to get large pay-rolls ready with all details of work done, deductions for rent, hospital, store account, etc., within one day of the close of the month, besides having at the accountant's elbow a sufficient daily record of every detail of each man's employment, indebtedness and balance due him beyond chance of dispute. It is surprising how simple and accurate the method is, once the proper forms have been worked out. Here is where the greater part of the brain work must be applied. Common sense and the faithful recording of details *on the spot*, with a filing of forms each evening, will accomplish all the rest, provided that the forms themselves be prepared by a master hand. Perhaps some further illustration may be forthcoming later, if your readers evince sufficient interest to make it profitable.

THEO. B. COMSTOCK.

Los Angeles, Cal., Oct. 3, 1903.

REMARKS ON THE RAND CONGLOMERATES.

The Editor:

Sir.—I have read, with much interest, the article by M. de Launay in your issue of April 4. Though much discussed already, the question of the origin of these auriferous conglomerates of the Rand always remains interesting, especially to those connected with the gold-mining industry here. I therefore beg to contribute a few observations on the subject, having been engaged as mining engineer and geologist on the Rand for the past nine years.

Occurrence.—The so-called Witwatersrand beds consist of schists, slates, shales, quartzites, quartzitic sandstones and conglomerates of Devonian age. This whole formation can be divided into three parts:

1. The lower beds overlying the plutonic granite base consist of sericitic schists, white and greenish quartzites, and ferruginous shales. 2. The beds in the center of the formation contain red shales, finely and coarsely grained quartzitic sandstones and conglomerates, which, on the Rand proper, at least, consist of small pebbles up to walnut size. 3. The upper beds consist of quartzitic sandstones, interstratified with conglomerates and a few less ferruginous shale-layers. These upper beds contain the famous Main reef, and the other conglomerates known locally as Bird's reef, Kimberley reef, Elsburg reef, etc.

Generally speaking, the strata on the hanging-wall side contain more conglomerates and sandstone, and the texture is coarser than that of the strata in the footwall direction. The latter contain more shales or slates, especially ferruginous ones, and the quartzites are harder and finer grained. Besides these general characteristics, there are also specially marked beds within the Witwatersrand formation which form valuable guiding rocks or pointers; among these, mention may be made of the light and dark-striped Hospital Hill shales, the green-colored quartzites and certain quartzites containing feldspar.

The uppermost beds of the Rand formation are overlaid unconformably by amygdaloidal diabase, the Black reef formation consisting of quartzites and shales, and the dolomite-chert formation. In other parts of the country, for instance east and west of the Rand proper, the upper Witwatersrand beds and, in places, the middle and lower ones, too, are entirely covered by the above-mentioned younger formation.

The Witwatersrand formation, it is assumed, was deposited on an ancient sea-shore; in a similar way, to-day, sandstones and conglomerates are still being formed.

It is, however, difficult to explain the unique uniformity of some Rand conglomerates, especially the Main reef, which remains the same conglomerate layer for forty miles without any interruption. On every shore where conglomerates are produced, changes from sandstone into conglomerate and *vice versa* are frequent, and it is a question whether, in this case, the action of the waves alone can suffice as an explanation, or whether other agents also must be considered.

Assuming, for instance, a large plain situated between the shore and the mountains, traversed also by rivers, whose estuaries are exposed to frequent tidal floods, such plains would become covered with sand. Strong winds would blow away the finer sands and leave only the coarser pebbles. So that the whole plain would be covered with a layer of well-rounded water-worn pebbles, presenting an aspect resembling those large pebble-covered plains in Arizona, where also only the coarser particles of the covering sand have been left by the wind. Another flood would then again overspread the pebble layer with, say, a thin bed of sandstone, of which the finer particles might be carried away as before, leaving only patches of sand. This would explain the numerous sandstone partings existing in big reefs. In such a manner a layer of pebbles of varying thickness is produced till a greater flood covers the whole with a thick bed of sand, of which only the uppermost part again is sorted out by the wind, leaving another conglomerate. If we assume an origin of this kind for the upper part of the Witwatersrand formation, then the peculiar uniformity of some conglomerates can be explained easier than by taking into account the action of the waves alone.

Now as to the gold content; generally speaking, the whole mass of the Witwatersrand formation is auriferous. In every bed, whether shale or quartzite, traces of gold can be found. A concentration of the gold, however, has taken place within certain conglomerates, and, locally, within a few other beds. The question now arises, how did this concentration take place? and did it occur in the conglomerates? These questions are naturally also connected with the origin of the conglomerates. The observed facts given by M. de Launay are generally correct; I should only like to make a few additions.

The pebbles of the conglomerates consist of quartz, quartzite and quartzitic schists (*kieselschiefer*), and never contain gold. In the Main reef they consist almost entirely of dark and light quartz, with now and then a few pebbles of quartzitic schist. They are well rounded, especially in the Main reef, or show only blunted angles, as, for instance, within the Kimberley and Elsburg reef series. In some places in the Kimberley reef water-worn pebbles of pyrite are found, which, however, are distinct from the balls of marcasite, of buckshot size, occurring within the cement of some conglomerates. Near large dislocations, the quartz pebbles are (owing to high pressure) sometimes broken and the pieces cemented together again.

The gold is entirely contained in the cementing material, which consists of quartz, pyrite and all accessory minerals which are also contained in the quartzitic sandstone, besides crystals of other minerals, such as garnets, apatite, etc., which are not contained in the quartzites.

The chief point, however, is the fact that this cement is, at least in the Main reef and other rich reefs, to a large extent of secondary origin, and of crystalline nature. Where the interstices between the pebbles are filled in with sandstone, no matter how well-rounded and large the pebbles may be, the reef is poor. These poor reefs are also often characterized by the fact that pebbles do not lie closely in contact, but are separated by a sandstone cement, which naturally, in this case, cannot be of a secondary origin.

The gold in the rich conglomerates is crystalline and mostly associated with, or contained within, the crystalline pyrite and quartz. This proves that its origin must be likewise secondary.

The numerous dikes and faults cutting throughout the formation are due to folding and tilting. Generally speaking, they are more frequent in the outcrop mines than in the deeper levels, where the ground is more settled and the dip becomes gradually flat. These faults show an unmistakable influence on the yield of the reefs, and the secondary fillings of igneous rock or vein-quartz, which often follow these breaks, in many places contain gold themselves, sometimes in considerable quantity.

Hypothesis of Formation.—There are three theories to be considered:

1. The gold was washed down and deposited with the pebbles.

2. The gold was precipitated during the formation of the conglomerates.

3. The gold was impregnated after the formation of the conglomerate.

1. *The Placer Theory.*—M. de Launay sets forth what can be said in support of this theory, and he states as facts the regularity of formation, the similarity to American placers, the existence of a siliceous cement, and the position of the richest part at the bottom of the reefs and with the largest pebbles. The assumption, however, that the richest gold should be always associated with the largest pebbles is not quite correct. The Elsburg reef and the Kimberley reef with their large pebbles are not nearly as rich as the Main reef; and even within the Main reef series the richest reef is generally the South reef, which contains the smallest pebbles. Furthermore, the gold, though found in places on the footwall of the reef, is often most conspicuous in the center or on the hanging-wall; a fact difficult to explain by the placer theory, especially as the gold is not deposited in distinct bedding-planes.

Another objection is the following: Placer gold is known to be the finest natural gold, being up to 990 fine, while the gold from the Rand conglomerates is not finer than ordinary vein-gold. I have been informed that in California investigations on placer gold have been made which have proved that the smaller the particles of gold the finer was the gold, and the coarser the gold the more impure (base) it was. The outside part scraped off from large nuggets was of the same fineness as the small placer gold, but the inside was only of "vein-gold fineness." This shows that the placer gold is refined by the leaching out of the base metals under the influence of air, water, rolling, etc. For this reason, even if we assume a dissolution of the coarser placer gold or crystallization through metamorphism, the gold in the conglomerate should be of greater fineness in case it was placer gold, or at least a few water-worn nuggets should have remained. Finally, if we assume that the enormous amount of quartz represented by the pebbles of the conglomerates was derived solely from auriferous quartz-veins, there must have been quartz-veins of vast dimensions or an enormous number of them, and, besides, these quartz-veins must have been disintegrated entirely. This we can hardly assume; some remains of these veins at least should have been found. It is much more probable that the quartz of the conglomerates and sandstones was derived from all pre-existing quartz-containing rocks of which the softer mineral contents were ground up fine, whilst the harder quartz remained in coarse particles and was separated from the finer material by natural classification.

The Precipitation Theory.—This theory, which is supported by M. de Launay and other geologists, would explain the crystalline nature of the gold and pyrite; it also explains the gold contents of the whole formation where the gold is more evenly distributed and not associated with any particular structure; but it cannot explain other facts, as, for instance, the concentration of the gold in the conglomerates. If there was an intermittency in the action of the precipitation or a periodicity in the occurrence of the saturated solution, it is difficult to conceive that this periodicity should have been always coincident with the formation of a conglomerate. Furthermore, why should the surfaces of the pebbles have a greater precipitating influence than the sands? If it is argued that the conglomerates were deposited with a greater amount of pyrite than the sandstones, it can be said that there are also conglomerates very rich in pyrite but poor in gold. Besides, there are streaks

within the sandstones consisting of almost 50 per cent of pyrite, but containing no more gold than the normal quartzitic sandstone. It is also difficult to think of a precipitation within the tidal wave of a seashore; in still water, however, no coarse sandstones and conglomerates can be formed. The fact that the yield (gold contents) of the conglomerate is so largely influenced by the close proximity of some of the dikes and faults would lead one to believe that the deposition of the gold was contemporaneous with the formation of fractures.

The Impregnation Theory.—By this theory, which is supported by the majority of the local geologists, most if not all observed facts can be explained. The objections M. de Launay raised against it are:

1. That it fails to make clear why the pebble beds, of the same degree of coarseness and of identical physical structure, are, at a distance of a few meters, one gold-bearing, the other barren.

2. That it does not explain why the gold-bearing pyrite is confined to a certain number of distinct layers instead of being disseminated all over, according to chances offered by the varying structure of the conglomerate.

3. That it gives no clue to the presence of rolled pyrite.

As to the first objection as above stated, the coarseness of the pebbles has nothing to do with the yield, or only in so far as a coarse-pebbled conglomerate inclines more to greater porosity than a small-pebbled one, and therefore offers less resistance to percolating solutions. But if large pebbles are imbedded in sandstone, there is as little opportunity for solutions to percolate as in sandstone itself. On the other hand a small pebbled conglomerate if not mixed with smaller particles, sandstone, etc., can be as porous as, or even more than, a big pebbled one; and by an exact investigation it will be found that the physical structure in the rich and poor reefs is not identical, as M. de Launay states.

Referring to the second objection, the same reasons are applicable in explaining why the gold and gold-bearing pyrite are not disseminated all over, but confined to a certain number of distinct layers, according to the chances offered by the more porous structure of these conglomerates to the percolating solutions.

Taking the third point, if the presence of a rolled piece of quartz can be explained by this theory, why should the presence of a rolled piece of pyrite not be explained? These pyrite pebbles of course have nothing to do with the impregnation, but simply have been deposited in the same way as the quartz pebbles, only that they came from a less distance; but some of the quartz pebbles also came from afar and from nearby. The impregnation theory does not mean that all the pyrite came into the conglomerates by means of impregnation, but that only the secondary gold-bearing pyrite was precipitated, together with the largest part of the gold, by percolating solutions.

Dr. Koch, of Berlin, who made numerous microscopic investigations of the Rand conglomerate, found that all the gold was crystalline, and the pyrite partly crystalline, partly water-worn. We can assume that the primary pyrite came down with the other material, of which the sandstones and conglomerates were formed, and was deposited with it.

The impregnation theory, moreover, explains the influence of dikes and faults, and the occurrence of rich shoots and patches. It is improbable that the gold-bearing solutions rose all along the conglomerates themselves, but it is conceivable that they came up in numerous cracks and clefts, partly occupied by eruptive rocks, and caused by the tilting up of the formation. They penetrated into the porous conglomerates where these were cut through by the breaks. Here they cooled down while percolating and gradually were deprived of their contents of gold, iron, sulphur, etc., which they had collected by leaching in their passage through the whole, more or less auriferous, strata.

They percolated through the whole Main reef and through parts of other reefs, producing rich shoots or patches, according to the extent or shape of more or less porous stretches. In conglomerates not porous enough for entire penetration, they caused pay shoots only along a particular fracture, as is the case, for instance, in the Chimes mine, where the Chimes reef, belonging to a barren series of conglomerates, suddenly gets rich in gold along and on both sides of a large fault, but loses its yield at some distance from the break.

The Kimberley reef, generally not payable, becomes payable in the farm Luipaardsvlei on the West Rand, where it is cut through by numerous faults. The enormous richness of the South reef in the Ferreira and Wemmer mines along a diabase vein is well known. Similar instances, showing the influence of faults and dikes on the gold content, could be collected from almost every mine. In some instances the precipitating influence of the solutions was greater, causing an enrichment; in other instances, the leaching influence was predominating, causing an impoverishment of that part of the reef adjoining the break. Taking the above theory as correct, the conglomerates should be, generally speaking, richest where most tilted up and cut through by dikes and faults; they should become poor in places where less removed from their original position and less broken.

In the eastern extension of the East Rand, where the formation flattens and thins out considerably, and where also the Main reef gets narrower and even pinches out for hundreds of feet so as to hinder percolation, the yield should recede, while on the Central Rand it should be highest. For the same reasons, the deeper regions of the Main reef series, where the formation is more settled and not so much broken through by dikes and faults, are likely to be poorer in mineralization, generally speaking.

It will take some time to reach these deep zones by mining, and although there is no cause yet for apprehension, it is idle to figure already on plans and problems for mining the Main reef from 8,000 to 10,000 ft. in depth. It is true that Methuselah died*, but nobody expects for the Rand goldfields an age which Methuselah attained. The Rand as as a goldfield is only 17 years old now, and still there are incalculable quantities of payable ore to be worked out. It is not to be compared with any other goldfields, because the conglomerates, as parts of the sedimentary formation, present a far more extensive gold-bearing area than any other known region, and the even distribution of gold in them forms a much surer basis for a safe calculation on the future of a mine than the patchy quartz-veins, no matter how rich they may be in places. Besides, there is any amount of low-grade conglomerate, and with cheaper and more effective labor there are great possibilities for a further enormous extension of the gold industry, not only on the Rand, but also in other parts of South Africa.

J. KUNTZ.

Johannesburg, July 27, 1903.

*Mr. Kuntz refers to an editorial entitled "Even Methuselah Died," in our issue of May 2, 1903, in the course of which we pointed out that even the Rand deposits must have limits.—EDITOR.

VOLATILIZATION OF METALS AS CHLORIDES.

The Editor:

Sir.—I welcome the opportunity afforded me by Mr. Edwin H. Hawkins, in your issue of October 3, to acknowledge that a considerable portion of my letter of September 5 was written some little time prior to the publication of Mr. Croasdale's valuable article on the volatilization of chlorides. Further, I am also in agreement with Mr. Hawkins that under the conditions as now defined for the Pohle-Croasdale operation, the double chloride of copper and gold formerly in controversy does not exist, and that in its stead finely divided metallic gold may be found anywhere along the line of draft from the throat of the furnace to the condensing tower, a distance of 100 ft. of flue, excluding the length of the dust or expansion chamber.

Until the publication of Mr. Croasdale's article I was under the impression that my experiments were conducted along lines exactly parallel to the Pohle-Croasdale procedure, but it is now evident that the difference between our methods must have been more radical than then supposed, because neither were the high temperatures necessary, nor was there noticeable production of oxy-chlorides or basic chlorides, and in some instances also the double chloride of copper and gold was proved to exist, as stated in my former article. This salt, by the way, was suggested and, I think, definitely shown to exist some years since in some German research.

I am also in agreement with Mr. Hawkins, that the factors of time and temperature are necessarily coupled in any commercial operation; but I confess my inability to understand the methods by which Mr. Hawkins arrived at his conclusion that these gases or "fumes" are not alloyed when he emphasizes that "the time requisite for complete commercial volatilization is reduced when any two or more of the above metals (copper, lead, gold and silver) are present in an ore." One would naturally conclude that by the action of mass of two chlorides both the time and the temperature would be lessened, or, at least, that in the same time necessary for the complete sublimation of an ore containing one metal the complete sublimation of a bi-metallic ore might be accomplished at a lower temperature. If the operation be commercial in the former instance, it should surely not be less commercial in the latter.

As Mr. Croasdale has so well and clearly stated in his admirably written contributions to the JOURNAL, the irregular conditions of experimental research do not permit of the most accurate observation of the effects of mass action on either furnacing or recovery process; and it will also be evident that while the microscopical study of the condensed "fume" or crystallization clearly reveals the existence of a more or less complete intertwining of the precipitated crystals, which may or may not be accepted as deposited eutectics of the alloys, all of these observations may be contradicted by proof positive from operations carried on upon a large scale. It is Mr. Hawkins' opinion and observation, made undoubtedly with greater facilities than at my command, that alloying of the gases does not occur under the conditions of the Pohle-Croasdale operation. It is my opinion and observation, confirmed by pretty careful experimentation, that under the conditions and the methods adopted, largely in the absence of excesses of SO_2 and SO_3, alloying of the gases does occur and may be utilized to lower the temperature of operation. It may be that with later and more extended observation both or either of us may be willing to agree that "it is better not to know so much, than so many things that ain't so." In the meantime, I shall trust to be able to continue my experiments along these very interesting lines of research, for in the absence of better proof to the contrary than has been yet in evidence, I am satisfied to leave the decision of this question of alloying of the gases to time and the larger operations as aforesaid.

Until that time, while acknowledging my error in assuming that our lines of research exactly paralleled, I must reiterate that my letter of September 5, 1903, expresses very nearly the theoretical conditions of sublimation of the metallic chlorides.

HENRY A. MATHER.

New York, Oct. 5, 1903.

ALLOYS OF KNOWN MELTING POINTS.—A composition of nine parts lead and one part silver melts at 400° C. Three parts lead and one part silver melts at 500° C. Six parts lead and four parts silver melts at 600° C. Eight parts silver and two parts copper melts at 850° C. These alloys are convenient for temperature determinations.

COAL MINING IN THE INDIAN TERRITORY—THE SOUTHWESTERN FIELD.

By W. R. CRANE.

Coal mining has been carried on in the Indian Territory for fully 25 years, although in a very desultory way prior to 1895. Several of the larger mines have, however, been operating for 10 and 15 years or more. The Dawes' Commission has published an excellent map showing the workable coal lands in the Territory that have been allotted for sale and leasing privileges. The strippings and other workings are grouped more or less about small camps through which the Rock Island, formerly the Choctaw, Oklahoma and Gulf Railroad, passes and about points on the Kansas City Southern and other roads.

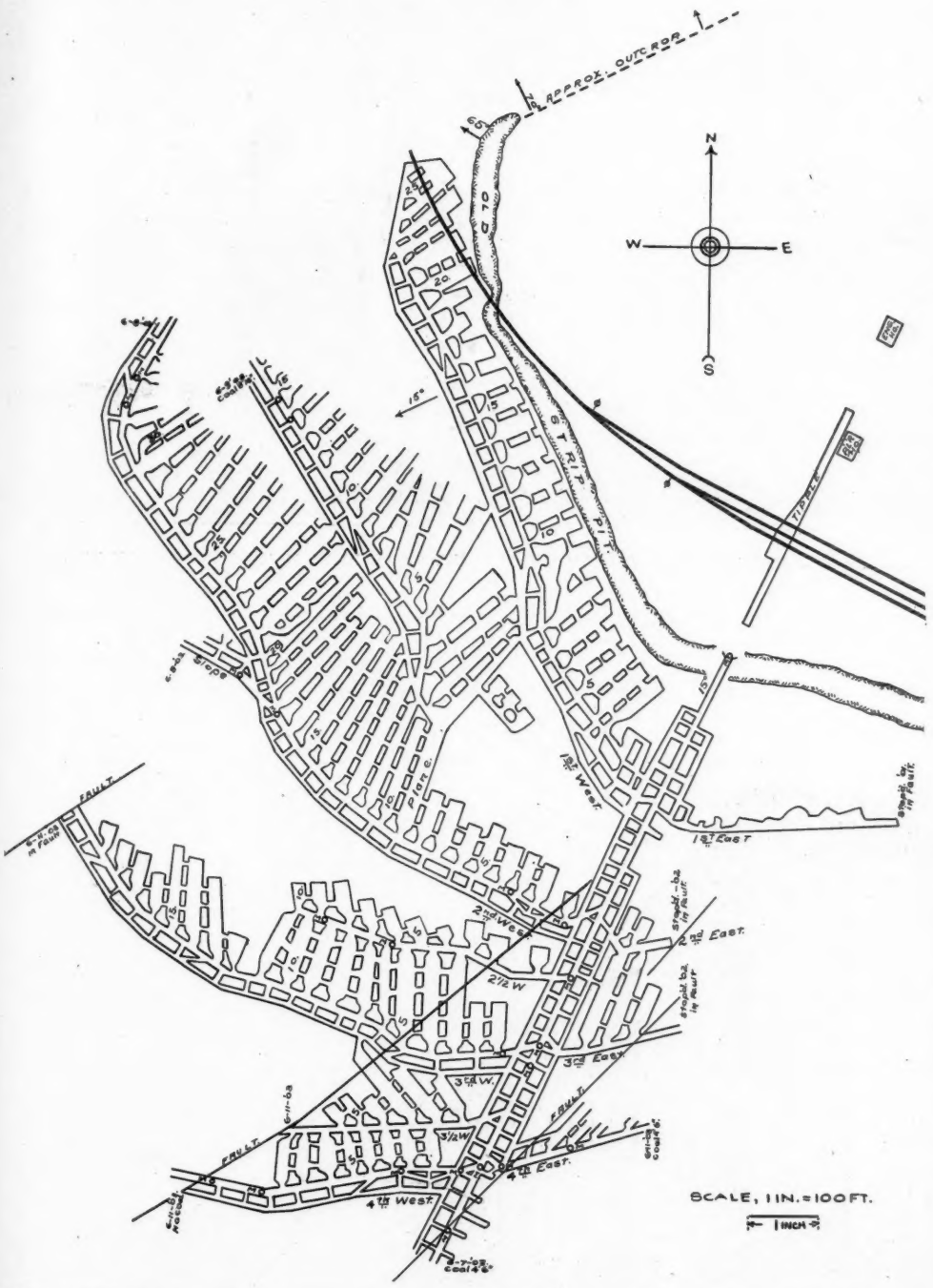


FIG. 1—THE GREAT WESTERN COAL AND COKE CO. MINE NO. 8, BAKER, INDIAN TERRITORY.

For convenience of description the coal strata of this field have been divided into three separate beds, known by the trade names of McAlester and upper and lower Hartshorne, which occur from above downward in the order given. This custom of designing the seams by special names is somewhat misleading, in that it leaves the impression that there are but three distinct beds, while there really are a large number besides, ranging in thickness from a few up to 12 and 18 in. In fact, the seams specially designated, are often locally and occasionally quite extensively subdivided into two or more parts by thin partings of shale. The seams range in thickness from 6 in. to 8 ft., there being a lack of uniformity in thickness over areas of any considerable extent. A 6-ft. seam may break up into three or four separate seams in almost as many rods, while it may extend for miles unbroken in another direction. Variation is, however, the rule rather than the exception in the Indian Territory coal-fields.

The following section, noted in the eastern part of the field, illustrates remarkably well the occurrence of the coal:

30.00 ft.	Sandstone	30.00 ft.
.66 "	Shale (roof)	30.66 "
.66 "	Coal	31.32 "
.08 "	Shale	31.40 "
2.00 "	Coal	33.40 "
1.25 "	Shale	34.65 "
1.08 "	Coal	35.73 "
.75 "	Shale	36.48 "
2.00 "	Coal	38.48 "
	Shale (floor).	

The coal-beds of the Territory are more or less tilted, but there is no fixed inclination for the strata of any locality—variations of from 2 to 5 and sometimes of 50 degrees have been noted within a distance of half a mile. Tilted anticlines and similar phenomena may cause the strata to vary considerably in pitch within short distances. (Fig. 2.)

A few very close folds have been discovered and faults with displacements ranging from a few up to 8 and 12 ft. are not uncommon.

The dip seldom varies more than 4 to 5 degrees, except at the outcrop, where it is usually less than that of the main part of the seam, as shown by subsequent development. It is not uncommon to find the dip at the outcrop steeper than below. The dip most common to the field is probably 16 degrees—the maximum and minimum being 70 and 10 degrees.

Local phenomena, such as rolls, slips, horsebacks and bells, or pot slips, are of frequent occurrence. These, combined with a naturally weak and friable roof, make development and mining not only difficult, but in many instances hazardous. Fig. 2 gives a good idea of some of the local conditions commonly met in the mines of this district.

The roof is composed in most cases of argillaceous shale, which has been disturbed more or less by folding and faulting, producing a condition in the roof fittingly described by the term "choppy." In the northeastern portion of the field, especially in the Cavanal, Poteau and Sugarloaf Mountains, the coal, which belongs to a higher horizon, is overlain by a stratum of hard sandstone or quartzose rock ranging from 30 to 50 ft. thick. Here the orographic movements seem to have been less intense and local disturbances are fewer, probably due largely to the thick and strong rock covering.

Both roof and floor are as a rule more or less wavy, producing what the miners call a "pitchy" top and bottom. Besides the irregularities noted, joint planes nearly always occur, especially when the top and bottom are shale, and along the lines of the joints or cleat a settlement or displacement of several inches usually takes place as a result of mining operations. The broken or choppy roof together with numerous rolls, pot slips and clay veins or horsebacks, make the workings difficult to maintain, and often dangerous. Taking the mines of the Territory as a whole, they are not what might be called wet, but there are localities where drainage is a serious problem. Another condition in the mines is probably much more serious than the trouble from contained waters; namely, the disintegrating action, weathering it may be called, of the shale roof and walls, due to atmospheric moisture. During the months of June, July, August and September the warm, damp ventilating currents forced through the workings deposit much moisture. The mines are then said to "sweat," and during this period most of the serious falls of the roof and walls occur.

The room and pillar system of mining is commonly employed, but owing to the dip of the strata it is customary to work the rooms to the rise in order to facilitate handling the coal produced, and to simplify drainage, especially in the working places. Fig. 1 shows the plan of a typical mine. Inclined shafts (more properly called stopes) are used in most cases for dev lopment. These form the main lines of haulage from the mine, and from them side and back entries are driven, usually at right angles.

From the side entries on the upper, or outcrop side, the rooms are worked up the rise almost to the back entries above. The unworked portions left between the ends of the rooms and the back entries are called chain-pillars. The length of the rooms requires the entries to be driven somewhat closer together than when working nearly horizontal beds, since rooms can then be worked from both sides of the entries. Back entries and air ways are driven parallel with the side entries and with the main haulage ways, respectively, the latter connecting with the slope by break-throughs at intervals, depending largely upon local conditions affecting ventilation. Main ways, or slopes, for single and double tracks

are driven 8 and 12 ft. wide, by 5 ft. 8 in. and 6 ft. 2 in. high, measuring from top of rail. In some mines, especially in the lower portions, the slopes are not brushed down, but are carried at just the height that the coal is thick; this is, however, poor practice unless the coal is, say, 5 or 6 ft. thick. The side entries are usually carried at the same height as the slopes, but when the coal worked is thin, they are brushed down; the width varies from 6 to 8 ft. The back

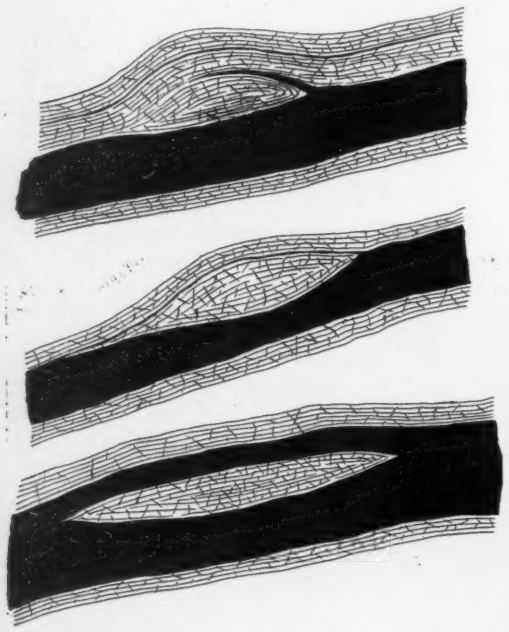


FIG. 2—SECTIONS SHOWING IRREGULARITIES IN COAL BEDS.

entries are driven from 6 to 8 ft. wide and are as a rule unbrushed, thus having a height equal to the thickness of the coal seam. The air ways are always left unbrushed and vary from 6 to 12 ft. wide. The distance between side entries varies from 250 to 300 ft., the rooms accordingly being 225 to 275 ft. long and the chain-pillars having a width of 25 ft. The rooms are usually from 20 to 30 ft. wide (24 and 25 ft. are common widths); they have 36 ft. centers. The pillars left between air ways and slopes are about 12 ft. wide, while those left between side and back entries are from 25 to 28 ft.

When the pitch of the coal strata is moderate, say from 9 to 12 degrees, the slope is usually run with the dip, i.e., at right angles with the strike, the side and back entries are then parallel with the strike, or run on the level, while the rooms are worked to the rise, parallel with the slope. There is no special difficulty in handling cars under such conditions, but with steeper pitches, 16 to 20 degrees and upward, some modification of the system must be made to permit cars to be hauled to the breast. This is usually accomplished either by shifting the direction of the slope, or driving the slope to the dip and the entries at a greater or less angle with it. In either case the entries are run diagonally across the dip, increasing the grade until a maximum of 10 degrees is reached. Similarly the rooms are often turned at some other angle than 90° to the entries. Dips ranging up to 40° are worked by thus changing the direction of entries and rooms. When, however, the pitch is too steep—20 degrees and upward—to permit the employment of ordinary means, chutes and planes, gravity and engine, must be used.

The cleat of the coal also influences to a considerable extent the laying out of lines of haulage and workings, as entries and rooms, especially the latter. There is no uniformity in the direction of the joint planes in this field, but usually they are normal to the dip. The average distance between the joint planes is probably 18 in., being fairly uniform for any one locality or mine. Rooms run normal to the cleat, or face on, are often necessary to keep the roof in good shape, but require much more care in placing the shots and also the use of more powder. When a room is worked at an angle with the entries, so as

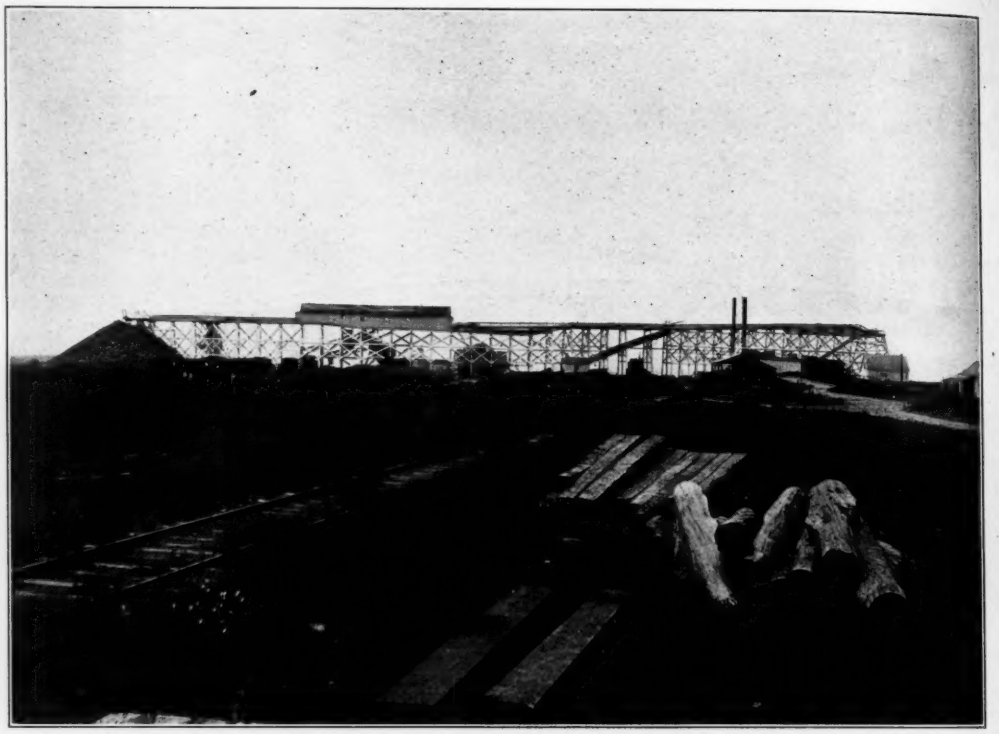


FIG. 3—BOLEN-DARNELL COAL COMPANY'S MINE, NO. 3, NEAR McALESTER, INDIAN TER.

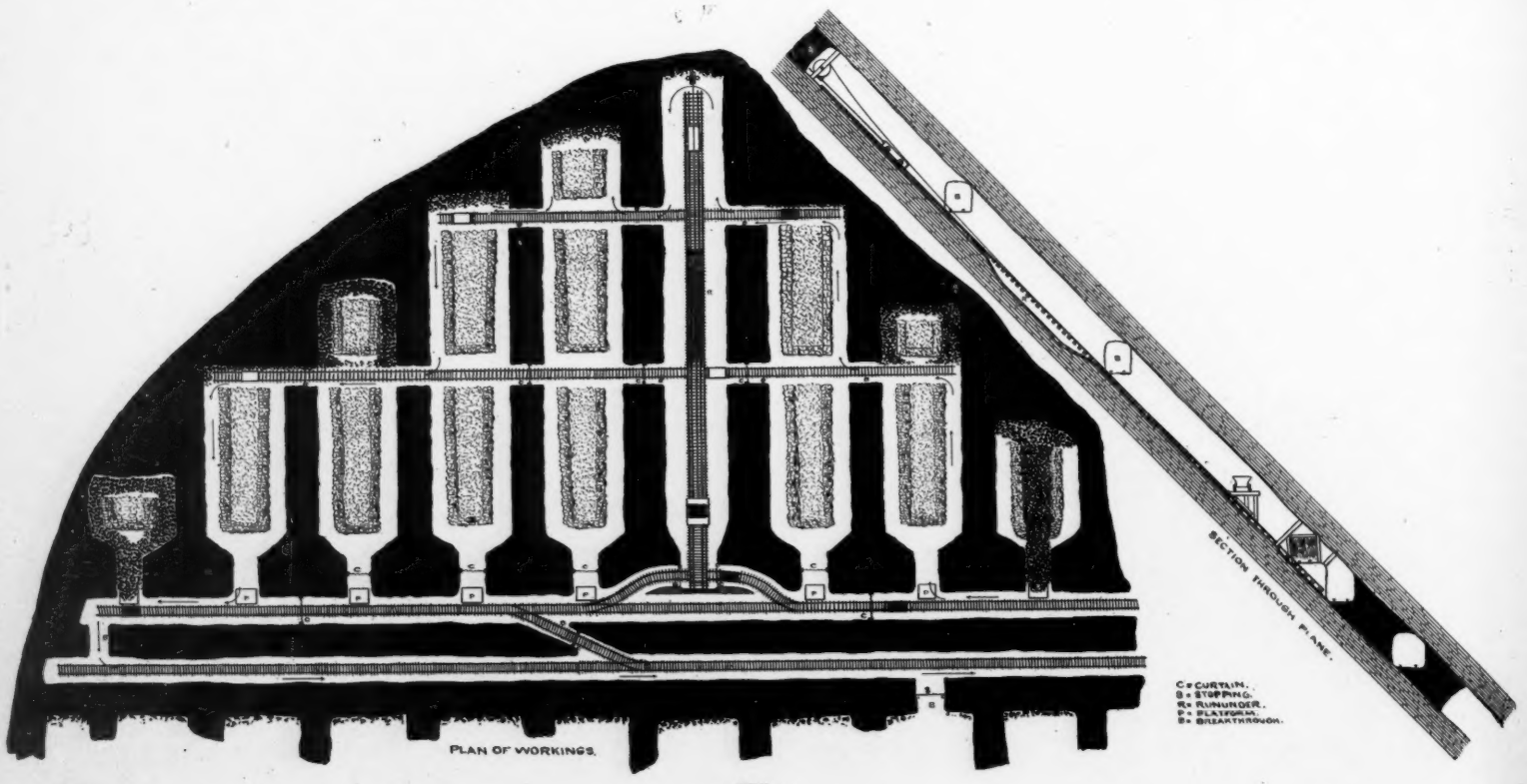


FIG. 4.

to reduce the grade, and is of necessity run face on, or nearly so, one of the face-angles is acute, forming a so-called "tight corner," extremely difficult to work since it requires a great deal of hand-labor and heavy charges of powder to maintain the proper dimensions of the room, and keep it from finally pinching out entirely. Miners do not care to work such rooms, and the system is therefore seldom used.

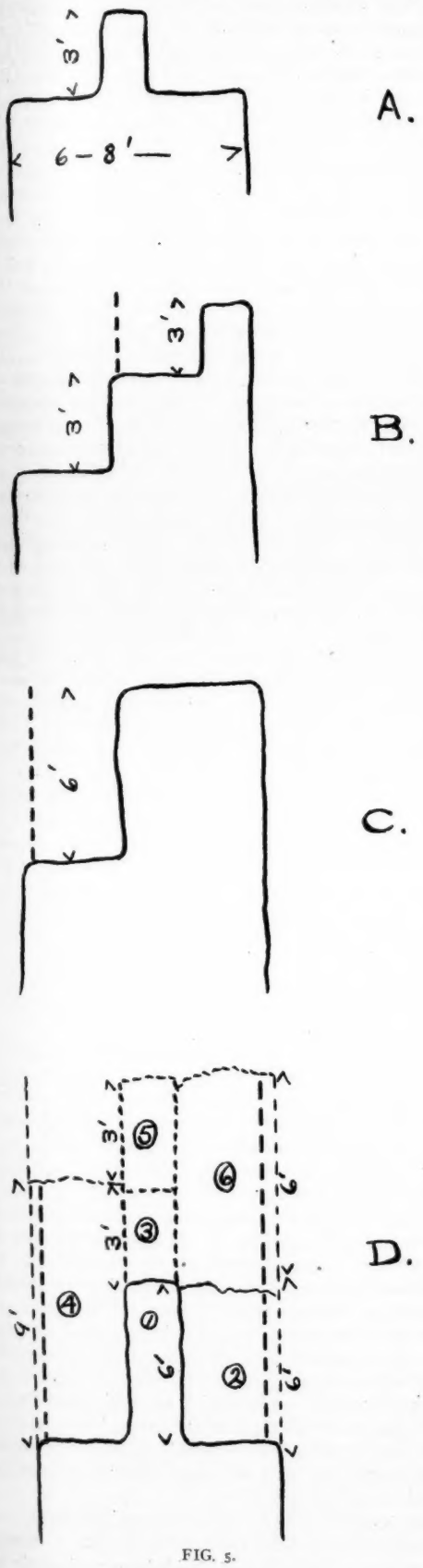


FIG. 5.

When chutes and planes are employed the grade is a minor consideration, while ease of breaking down the coal is given first place, and the rooms are worked parallel with the cleat.

The method employed in working at the face varies somewhat. Cuttings are almost invariably employed; these, with a proper arrangement of shots, permit rapid work and a remarkable control of size, shape and direction of workings. Fig. 6 illustrates the method of placing cuttings and holes; A, B, C and D show methods of driving entries and working rooms. As a rule the coal is blasted from the solid, little undercutting being done; the bottom coal is first removed by carefully placed shots, when the remaining unbound portions can be forced down by wedges or blown down.

Post and breast augers are used, the former being probably in more general use. The form employed, however, depends largely upon the character of the coal—breast augers for soft formations and post augers for harder materials. The holes range from 1¼ to 2½ in. in diameter; 1½ in. is a fair average. Several varieties of powder—giant and black—are used, the former being for special work, as driving entries, brushing, etc. Powders which have sodium nitrate as the oxygen-producing substance or the so-called "non-shipping" powders are probably more generally used than ordinary forms, though the sodium nitrate powders have fallen somewhat in disrepute in certain localities, due, it is claimed, to their being more inflammable than potassium powders. The FF brand of both forms is commonly used. Powder is placed in paper shells, forming cartridges ranging, in length, from 8 to 36 in. Shots are fired by fuse and primers or electrically, the former method being more largely employed in underground work. The quantity of coal mined per keg of powder ranges between 22 and 35 tons; about .6 to .7 lb. of powder per ton of coal.

The appliances employed in transferring coal from breast to entry are, as a rule, very crude, the main object being to handle the coal as economically as possible. Modifications of single and double-chute breast-workings are quite common, as are also buggy-breasts—often both systems may be found in operation, side by side, in the same mine. Chutes are often nothing more than portions of the floor, cleared of waste, with low walls built up out of the larger pieces of waste, over which the coal loosened at the breast can roll and slide to the mouth of the room or the entry below. With high pitches the irregularities of the floor, though considerable, make little trouble; but with moderate pitches one or more men are required to keep the coal in motion. Sheets of metal, usually boiler plate, are often placed shingle fashion, and over these the coal slides. Usually, however, wooden sills are placed every 2 to 4 ft.; upon these, sheets of metal are securely fastened; side boards are then erected, held in position by short posts braced with outside diagonals. All-wood chutes are occasionally employed and are preferable to the metal-lined for steeper pitches. Single chutes usually occupy a central position in the room, and the miners enter the room and reach the breast by passing along the spaces between the walls and the sides of the chute, while in the case of double chutes, entrance is obtained by cut-throughs from rooms already worked, allowing free passage directly to the breast, or to a point a short distance below it.

When chutes are employed with moderate pitches, the coal is run on a wooden platform placed on a level with the car-track or, better still, some 8 to 12 in. above it, thus reducing the labor of shoveling into the cars. With steeper pitches it is possible to load directly from the mouth of the chute into the cars, thus saving the cost of loading. Pitches ranging from 18 to 35 degrees are worked by chutes to advantage.

Buggy-breasts and planes, both engine and gravity, though operated on the same pitch as chutes, are applicable to much steeper pitches—their range is from 20 to 45 and 50 degrees. Occasionally the cars are drawn by mule power up to the breast, by a hemp rope, which passes from the car to the breast, thence over a movable breast-sheave, mounted on a frame, and downward around another sheave, thus running it parallel with the station in which the mule travels. When filled, the car is lowered by gravity to the entry and is hauled o a parting or make-up station.

A typical form of gravity plane, for this field, consists of a slope carriage on a track of 5 ft. gauge, connected by a steel cable running over a breast-sheave, provided with a powerful brake, thence to a back-balance or counterpoise car (Fig. 4). The counterpoise car runs on a track of 3 ft. gauge and midway on the plane is a run-under, permitting the counterpoise to pass below the slope carriage. The counterpoise is usually a skeleton car loaded with long bars of cast iron, the weight being somewhat greater than that of the slope carriage and one empty car.

To facilitate the work of handling the cars as well as to increase the output of such a plane, it is made to draw its supply from four to eight rooms on either side. To start such a system the plane is first driven at least for the length of one room. Rooms are then opened on both sides or on only one side, as desired, and are worked upward, break-throughs to the plane being made at 50 ft. intervals, to allow the coal to be delivered directly to the plane. Other rooms are opened up from time to time, so that after the plane has been in operation for some months, the working faces of the rooms converge toward the plane in irregular lines, resembling inverted flights of stairs. Connecting the break-throughs are lines of track, over which coal is hauled from each new room as soon as the face has passed above its level. Fifty feet is then the greatest distance that coal must be moved from the working face, and this is usually by a double chute-breast. Gob walls are formed from 3 to 4 ft. from the walls of the room and the waste is thrown in between

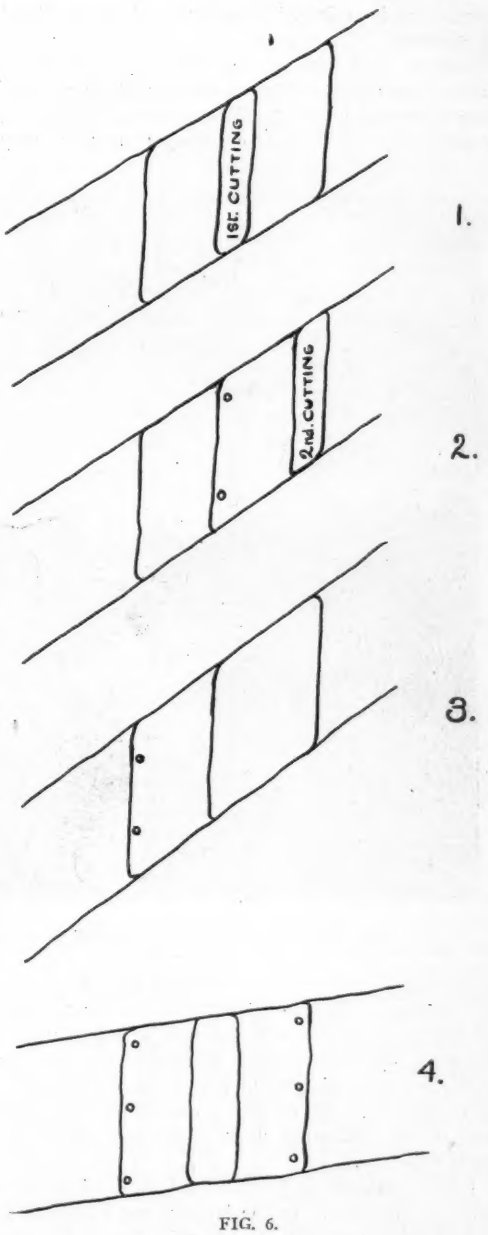


FIG. 6.

them, filling up the center of the room and leaving two passages between the gob and coal walls along which the coal moves, to a platform below, where it is loaded.

As the rooms are worked out, throwing the working faces further and further from the plane, the lateral limit—the width of 4 to 8 rooms to the side—is reached; then the plane will be shifted or possibly maintained as a line of haulage for supplies, timber, etc., or even, because of the workings under the existing conditions, will continue to be employed in transferring coal from the upper to the lower levels of the mine. Small compressed air and electric hoists, or winding engines, especially the latter, are employed on engine planes, operated like the gravity planes, but more generally used in transferring loaded cars, often in trains of from 2 to 6, from one level to another.

Endless and tail-rope haulage have been installed in a number of mines and have been remarkably successful under the circumstances. Mules are, however, probably the commonest motor; they haul empty cars into the rooms and loaded ones to the partings, especially in mines where the pitch is moderate. They are seldom found in mines where the pitch reaches or exceeds 30°, unless the side entries are quite long, when it is considered economical to employ them in collecting cars from room entrances and delivering them at the partings to be made into trains.

Electric haulage is being introduced and is very favorably received. In the large mines of the field it will soon supplant all other haulage. Electric motors are now operating in and about several mines, where they are employed in collecting and distributing cars in the mine, even pushing the empties into rooms where the pitch is moderate, drawing out of the mine trains of from 6 to 8 cars and hauling them to and from the tipple. For steep grades, especially on the slopes, the third rail, or cog system of haulage is occasionally employed. The third rail is employed only on the steeper grades and is not, as a rule, charged; current is taken by the overhead wire and trolley.

On slopes some distance from the shaft or main slope a power plant is often built on the surface above the slope and operates the plane by cables passing through bore holes. In other cases the rope from the main slope or shaft is led to the new slope by sheaves and rollers, and several slopes are operated by a single winding engine. Again where two workable seams of coal occur, separated by 10 to 30 ft. of shale, the two are also worked by slopes, superimposed, operated by a single winding engine.

As the work of development and extraction progresses, vertical shafts are sunk to the main slopes. The slopes and vertical shafts are, however, commonly operated separately, a winding engine being required for each.

The mine cars used have a capacity of 2,000 to 3,500 lb. and are of 36-in. gauge; 26-lb. rails are used for underground work and 30 to 35 for surface work. Wooden rails, usually 2 by 4 in. pine plank laid flat, are often used when the grade is too steep to permit the cars to be handled with safety even when spragged. The mean effective grade can, by this means, be increased considerably over what would be possible with iron or steel rails. Steel cables of 1 to 1¼-in. diameter are used for all hoisting and hauling machinery.

The surface plants were formerly temporary constructions, and are largely so at the present time, especially the tipple, engine house, etc., but during the past few years excellent buildings of all kinds have been erected. The tipples for slope mines are often built bridging gullies, especially where there are several openings to a mine or separate mines located on both sides of the same, or built on the side of a hill, and in a few cases built on level ground.

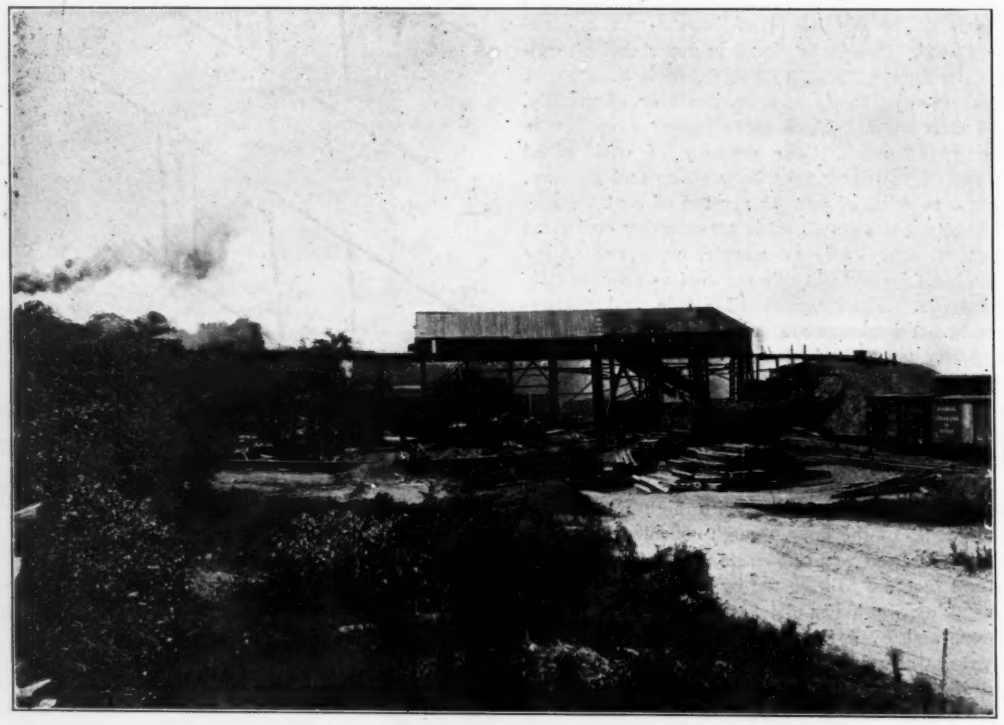


FIG. 7—COMMON CONSTRUCTION FOR TIPPLE, WILBURTON, INDIAN TERRITORY.

A good illustration of the gully arrangement is at Poteau, in the Cavanal mountains, where the one tipple handles the product of three separate mines. A tipple adapted for approximately level ground is shown in Fig. 3, which is the Bolen-Darnell mine near South McAlester. The side hill form of tipple—probably the most common construction—is shown in Fig. 7.

The usual arrangement of tracks for tipples, at slopes, is the switch-back, a train of cars being drawn up to the tipple on a trestle-supported track forming a continuation of the slope. The cars are permitted to run down the tipple, or dump, by gravity, the speed being regulated by a brake on the winding engine. They are finally brought to rest on a very nearly level section of track, emptied and switched back by gravity onto another section of track somewhat lower than the former, where they are made into a train and attached to the hauling cable, which is shifted from one line of track to the other. The empties are then drawn up to the point of switching and lowered into the mine.

Switches are operated both by springs and by hand. The automatic spring switches are in considerable favor, but are liable to get out of repair and fail to act properly. A few special forms of switches operated from the engine house by means of levers and rods, or cables, are giving very satisfactory service. Safety switches are also employed largely on the slopes and are usually situated some 25 to 50 ft. above the entrance to these. They are always operated by levers and ropes, or wires, the former being placed at the tipple station, so that if, as occasionally occurs, a train or part of one, should break loose and start down the slope, the person keeping watch can draw back the switching lever and thus derail the cars. Much damage and probable loss of life has been avoided by such devices.

The Mitchell automatic cross-over dump or tipple, for handling and emptying cars, is now being widely used. Another device, just brought into use, is the waste dumper, placed at the end of the tramway over which waste materials are hauled to the refuse pile. The construction is briefly as follows: The rails of the tramway track terminate in goosenecks, which are dropped from 6 to 8 in. below the level of the track. The front wheels of a car passing along the track will drop into the goosenecks, bringing the car to a standstill with its bottom at an inclination sufficiently steep to insure the discharge of the contents when the door is opened, by a series of levers easily operated by one person. It is claimed that by this dumper the labor of two or three men is done by one. It is easily constructed and the cost moderate, say $20, while the saving is at least $4 per day.

Although the mines are not, as a rule, very wet, yet there are portions of the field where the water problem is serious. The vertical depth of the workings, even in the most extensively developed mines, seldom exceeds 150 ft. The drainage problem is thus comparatively simple, except where the water is acid. In the earlier stages of the development of any mine, steam jets are often used to eject water, which is collected in conveniently arranged sumps located in the main slope. The main sump is usually at the foot of the main slope. Steam and electric pumps are used. It is seldom necessary to run them continuously, so they are mounted on trucks or placed in cars, which are raised and lowered by the slope hoist or an auxiliary engine. Flexible pump connections allow considerable latitude in the movements of the pump.

The Cameron and the Gardner types of pumps are probably most widely used. Portable electric pumps of the duplex and triplex forms are being installed in many mines. The sizes of suction and discharge of the pumps used range from 3 to 4 and 2 to 3 in. respectively. In a few cases tank cars are employed in freeing mines of water.

The mines of the Territory, are as a rule, gaseous, and in certain localities a few have been forced to cease operations. Several disastrous fires and explosions have resulted from windy shots and naked lights, and mine fires are common. It is not an uncommon occurrence to see miners who have been seriously burned by explosions of gas; the rooms being driven to the rise, gas collects at the working faces. The law regarding ventilation and the inspection of working places for gas and the means of freeing the mines from it is very strict, and yet naked lights are often used where gas is escaping from the coal in evident quantities.

In ventilation the air-currents maintained by exhaust fans pass down the slope to the lowest entries, where they are split and divided proportionately to the amount of workings on either side, thence by way of the side entries and back ways to the surface through the air ways and fans. The back entries are connected by break-throughs with the side entries, which are provided with suitable stopings and doors. The foul air passes back through the back entries, connecting by overcasts with the air ways, which lead to the surface. Many modifications of the system are in use.

Fans of the Guibal type ranging in size from 12 to 16 ft. in diameter and 4 to 6 ft. width of blade are used. To guard against accident two fans are usually installed at each mine, one on either side of the slope, each fan being driven by a separate engine (the Crawford & McCrimmon combination fan and engine are common), provided with a separate steam-pipe from the boiler room. Only one fan is used at a time, except when large quantities of gas have accumulated and prompt action is necessary to clear it out.

Considerable timber is used in the mines, especially where the roof is poor. The slopes' supports are usually caps and posts; only in rare instances are sills used. Occasionally, in double-track slopes, the caps are still further supported by posts placed midway of the cap, thus forming a row of posts between the two lines of tracks. The slope timbers are usually rough hewn or round oak or pine; when hewn, common sizes for caps and posts are 8 by 12 and 8 by 10-in.; round timber are usually 8 in. in diameter for all members of the set. Props for caps, in slopes, and for room-work are usually round timbers 6 in. in diameter. Most of the timber employed is native, cut from the neighboring hills.

Skilled labor is extremely scarce and labor troubles make estimates on a fixed output rather uncertain. Unskilled labor is expensive, since great precautions must be taken to protect it from its own carelessness and ignorance.

The scale of wages paid the miners in the Indian Territory is 65c. for mine-run and 95c. per ton for lump or screened coal. The wages of the other employees about the mine and top works are as follows:

Weighmen, average per month	$55.00
Dumpers, average per day	1.50
Top hands, average per day	1.50
Master mechanics, per month	75.00
Hoisting engineers, per month	70.00
Firemen, per day	1.75
Blacksmith, per day	2.25
Helper, per day	1.50
Carpenter, per day	2.10
Pit boss, per month	80.00
Entry work, average per yard	2.20
Room turning, average each	5.00
Deductions to be made:	
Smithing, average per month	.75
House rent, average per month	4.00
Territory permits, per month	.25
Timber boss, average per day	2.25
Boss drivers, average per day	2.50
Tracklayers, average per day	2.25
Drivers, average per day	2.10
Cagers, average per day	2.20
Gobbers, average per day	2.20
Trappers, average per day	.90
Stable boss, average per day	1.25
Laborers	1.50
Narrow work, average per yard	1.60
Doctor, average per month	1.00
Powder, average per keg	2.00

The product of the mines is divided into commercial sizes that are quite uniform throughout the field. Grizzlies and jigger screens are used, but the latter is usually made up of two sections, independent of each other, but actuated by the same power shaft through eccentrics. The screening surface is usually perforated metal, and each section is divided into two parts, the sizes of the perforations for the four parts being 1, 5/8, 2½ and 4 in. respectively. The grizzlies or stationary screens are wrought iron ars, rectangular and diamond shaped in section, which are usually spaced 1 to 1¼ in. Jigger screens produce the following commercial sizes: Slack, nut, fancy lump, lump, and by covering the screening surfaces with sheet iron hinged to the inside of the screen frame, mine-run coal can be produced at will. Screened coal, lump and slack, and mine-run, are usually the sizes produced by grizzlies or fixed screens. The screening surfaces have an inclination of close to 35 degrees.

AMERICAN CEMENT TRADE.—There has been a large increase in imports in the eight months ending August 31 as compared with the corresponding periods in 1902 and 1901. In 1903 the receipts were 696,138,524 lb., of which Germany furnished 408,018,374 lb., Belgium 245,324,337 lb., Great Britain 25,255,545 lb.

IMPROVEMENTS IN THE CYANIDE ASSAY FOR COPPER.

By THORN SMITH.

No analytical method exists that cannot be improved; anything that saves time is a decided improvement providing it does not sacrifice accuracy. The cyanide method for copper is so well known and has been so frequently re-hashed that the writer hesitates in attempting to present anything new, or what he may consider an improvement. His experience with the method has been varied, as has been undoubtedly that of many others.

Necessity is the mother of invention, and when a method is a failure in some little detail it becomes necessary to invent a new wrinkle. About a year ago the writer was obliged, for a time, to make a large number of copper assays daily on a low-grade copper matte. Results were wanted as quickly as possible, and as close to the true content of copper as could be made by any volumetric method. The matte contained slag in small quantities, and was chilled in water to hasten the cooling. Owing to the silica it was found almost impossible to filter the solution. Recourse was had to the pump, but the suction required was so strong that the filter paper broke, and in many cases the strongest suction was of no avail.

The idea of using a Gooch crucible was hit upon, and the whole method became easy. The addition of a few drops of hydrofluoric acid still further simplified the operation. Other improvements in the writer's opinion followed, and have made the method in his hands the best by far of volumetric methods.

In detail the method as now used in this laboratory by the writer is as follows: For material containing not over 10 per cent of copper, use two grams; for material containing from 10 to 25 per cent, use one gram; over 25 per cent, use one-half gram. For slags and like material, containing but very little copper, up to five grams is advisable. Weigh into a No. 2 beaker and treat with sufficient nitric and hydrochloric acid to dissolve. Heat on the hot plate until the solution is low in volume, then add 10 c.c. of sulphuric acid and continue the heating until fumes of the sulphuric acid are freely given off; cool and add about 75 c.c. of water. Follow this with two strips of aluminum, about 2 in. long, 0.5 in. wide, by 1-16 in. thick. The ends should be turned up to prevent sticking together. The precaution should be taken to test the aluminum for copper, as it is frequently so contaminated. It is not necessary to filter the solution before adding the aluminum; such an operation is a waste of time and a possible loss of copper. Boil the solution hard until the blue color has disappeared, and it is advisable to continue the boiling for a few minutes. Then add 10 or 15 c.c. of strong hydrogen-sulphide water. If no blackening occurs, the solution is ready to filter. If copper sulphide is precipitated, boil until it coagulates.

Filtering.—Secure a porcelain Gooch crucible, all in one piece, having a capacity of 15 or 20 c.c.. To the bottom of the Gooch adapt a piece of filter paper and attach the Gooch to the filter pump. Turn on the full suction of the pump. If the solution filters slowly, add a few drops of hydrofluoric acid to the contents of the Gooch, and more to the solution in the beaker. Too much is worse than none at all. The solution should run about as fast as it can be poured, the whole operation requiring but a few seconds. Wash as much as possible of the precipitated copper into the Gooch, using wash-water containing hydrogen sulphide. Loss will occur if this precaution is not observed, as can be noticed in the filter flask. The strips of aluminum should be left in the beaker, together with the copper, which is not readily removed by washing. Two washings are generally sufficient, the little iron remaining rather aiding the final operation. To the beaker add 5 c.c. of nitric acid with a pipette, allowing the acid to run down the sides of the beaker to wash down any adhering copper. Heat to boiling and remove the plate. Now remove the Gooch from the pump and invert over a clean No. 2 beaker. Push out the paper disk with a platinum stirring rod. Holding the Gooch right side up, pour the hot acid from the first beaker around the edge of the Gooch. Rinse out the first beaker with 10 or 15 c.c. of bromine water and pour through the Gooch. Again rinse the first beaker with bromine water and, inverting the Gooch, pour over the bottom, allowing it to run through the holes. The Gooch should now be perfectly clean, and all of the copper in the beaker. The aluminum should remain in the first beaker. There is no danger of injuring the fingers with the acid if ordinary care is used. The bromine water does no harm. Cover the solution and boil until the bromine has disappeared. Remove from the plate and wash the cover. Add 10 c.c. of ammonia water and cool. Dilute to within 1 in. of the top of the beaker. The solution is now ready to titrate The small piece of paper in the beaker, together with the iron hydroxide and other insoluble matter, need not be filtered off, as it is much easier to titrate a somewhat cloudy solution than a perfectly clear one. The potassium cyanide solution should contain about 50 grams of 98 per cent. cyanide to 2,400 c.c. of water, which is about the volume of an ordinary 5-lb. acid bottle. It should preferably be made up a day in advance. Add the cyanide solution quite rapidly until the copper solution begins to fade. Then allow to stand about 30 seconds and add very gradually of the cyanide until the blue color has turned to a faint pink. A lemon-yellow color is an indication that too much cyanide has been used. A little practice will enable the operator to stop at the right point. Caution near the end is the key to successful work in any cyanide method. The cyanide solution should be standardized on an ore or matte in which the copper has been accurately determined by the electrolytic method, the only standard of which we can be absolutely sure. Once in ten days is often enough to re-standardize, and frequently no change is noted in much longer periods. Metallic copper should never be used as a standard.

The main cause of poor success, in the hands of so many, is the failure to use hydrogen-sulphide solution to determine whether all of the copper has been precipitated on the aluminum, and the further failure to use it in washing the precipitated copper. The copper is readily oxidized in the presence of air, and the small amount of acid present carries it through the filter. Another cause of poor results is too rapid titration, and, in many cases, the use of sheet copper for standardizing. The time required for the whole operation will vary with the material and the individual. In ores containing but little iron, the copper is rapidly precipitated on the aluminum, but on a low matte or other products, in which the iron is high, the precipitation requires from 10 to 20 minutes. It must be remembered that the ferric iron must be reduced, before much copper will precipitate. Some of our western friends would have us believe that seven minutes will answer in all cases. The writer requires 20 minutes ordinarily, and at least 15 in any case where the iron is high. One assay can be made readily in 45 minutes and several together in an hour. The following figures demonstrate that it is sufficiently close for almost any furnace operation demands.

Average of eight by cyanide	20.81 per cent
Average of same by battery	20.88 per cent
Average of eight by cyanide	25.45 per cent
Average of same by battery	25.47 per cent

The writer has simply adapted well known aids in steel analysis to copper analysis, and presents the manipulations in the hopes that they may be of use to those similarly situated.

Every electric charge is to be thought of as due to the possession of a number of electrons, but a fraction of an electron is at present considered impossible.

NORTHERN ONTARIO NOTES.

BY OUR SPECIAL CORRESPONDENT.

The silly riot at the Sault Ste. Marie last week was an unusual thing in Canada. But as soon as the military appeared on the scene the mob of workmen suddenly dispersed, and the threatened destruction of the works of the Lake Superior Power Company came to an inglorious end. About a dozen of the ringleaders are now in jail, and will get their deserts in due time. The damage to the property of the company did not amount to more than $2,000, mainly in the breaking of the windows and furniture of the office. The Ontario Government has guaranteed the wages of the men, from $250,000 to $300,000, which the local banks in the town have been instructed to pay at once.

It is rather an unexpected culmination of F. H. Clergue's great projects in Algoma; but too much optimism is not good for industrial enterprises, even in booming times. Putting the cart before the horse is a common mistake in such cases, and to practical men in any manufacturing business an abundant supply of raw material is the first thing, but the steel plant at the Sault Ste. Marie was built without having provided in advance for half enough ore to keep the works going, and the ore in the Helen mine is too high in phosphorus to make bessemer steel.

What the final outcome of the whole tangle may be no one can tell yet. But it is said that a syndicate of English capitalists will likely take over and operate the steel works and both the iron and nickel mines belonging to the company for a special purpose.

There has been a rumor for some time past to the effect that the French Government contemplates the adoption of a restrictive policy in regard to the nickel mines of New Caledonia, and the leading shipbuilding firms of Great Britain are anxious to secure an independent supply of nickel. This is the talk in the Sudbury district, and there appears to be something in it, as a number of nickel properties have lately been bonded by a London agent.

A party of American prospectors, mostly college students, have been out since early in the spring exploring the Hutton iron belt under the direction of Dr. C. K. Leith, the well-known authority on iron ore deposits. They found very little worth taking up to the east of Hutton, but they made some valuable discoveries on the western extension of the range. A local guide and canoeist was engaged for each of the two gangs into which the party was divided for work in the field, and thereby hangs a tale. It is no exaggeration to say that the best canoeists in the world are to be found in Northern Ontario and Quebec, and especially on the Ottawa and other rivers of this timber region. Some youthful and even older members of the prospecting gangs had the conceit that they could become expert canoeists in a few days. They know better now. There is no craft afloat that responds so promptly and obediently to its propelling force as a birch bark canoe, but the particular art of canoeing has to be learned in boyhood or one never gets what is called "the right touch of the water," though it all looks so simple and easy. In smooth water almost anyone can do for a second man to paddle in the bow, but running the rapids on the rivers of the North is quite another thing, requiring pluck, skill and judgment of a high order. In one of the parties referred to an inexperienced young man insisted on going down a very dangerous rapids. The old canoeist assented at last, and, getting a rope, began to tie the young fellow to the canoe. He wanted to know what such a proceeding was for, and when told that it was to save time in searching for his body at the foot of the rapids, he changed his mind and walked over the portage.

The development work on the Mackenzie nickel mine, in Levack, has been started, and the property is proving up remarkably well. The Murray mine, owned by the Vivians, of Swansea, Wales, but lying idle for some years, is said to have changed hands recently, and some of the old buildings around the works are being repaired now.

Several skilled mechanics have been brought from New York to look after the erection of the new smelting plant of the International Nickel Company, at Copper Cliff.

ORE STEALING.

The prevention of pilfering in gold mines is as much a problem at Kalgoorlie as at Cripple Creek, in Colorado; Sonora, in California, or other places where specimen ore is found in lodes. Our contemporary, the *Western Australian Mining, Building and Engineering Journal,* refers to the matter in a recent issue, and gives an amusing example of the methods employed by ore thieves.

"A case occurred only a few weeks ago at Boulder when a local assayer and ore-buyer was charged with receiving gold-bearing material reasonably supposed to have been stolen. A determined defence was raised on matters of fact, and the evidence of an auctioneer and his clerk was brought to prove that the accused had bought for the sum of $12.50 four bags of concentrates and some crucibles at a sale a few weeks previously, and prior to the visit of the detectives to his premises. Accused gave sworn testimony that the $2,500 worth of gold he was charged with having unlawfully in his possession was the product of the treatment of the concentrates by the crucibles purchased at auction for $12.50. Among the points raised by the accused's solicitor for the defence was that when the search-warrant had been executed and an arrest made in consequence of the property found on the premises, the proper legal course was to have proceeded with the indictable offence with which the accused was first charged but which had been subsequently withdrawn in favor of a charge involving summary conviction. The magistrate upheld the point raised that the information was bad in law, and furthermore decided that the facts of the case were not sufficiently strong to warrant a conviction.

"Since the recording of this decision the Attorney-General has given the opinion that the finding of the magistrate is entirely wrong, and thinks it likely that he confused sections 69 and 70 of the old act with the amended act. As, however, the magistrate's decision was based upon facts as well as law, no appeal can be made to a higher court, and that is how the matter stands at present. What the mine-owners now want is the inclusion of a rigorous search clause in the amended act, which, in the opinion of their legal advisers, would fully meet the case, and close the door of technicality to evildoers in the person of gold thieves.

"Another evil which mining men declare cannot be blinked at is the growing prevalence of gold stealing from the rich Kalgoorlie mines. Nothing can compare with virgin gold and specimen gold ore as an attraction to the plunderer. The spoil is portable and of high value, hence the need for the best of precautionary measures being taken for its safety. In the past, strenuous efforts put forward by the mining companies to overcome this evil of gold thefts have been principally confined to searching miners when coming off shift, and in inducing the detectives to make occasional raids on premises tenanted by local gold-dealers, but these tactics have signally failed to prevent the wholesale pilfering of free gold and rich telluride specimens.

"In fact, in spite of the most rigorous searching that working miners are subjected to, the practice of gold stealing from the Kalgoorlie mines has grown until it has now materialized into a flourishing industry, which finds constant and highly remunerative employment for hundreds of men, whose work is light and whose earnings are large. The question is often asked by shareholders in these mines how it is that the vigilance of the managers, backed up by the Chamber of Mines, does not effectually balk crime of this character. The answer invariably given by directors to inquiring shareholders is that the many cliques of gold thieves who infest this field lay their plans so well as to reduce the chances of detection to a minimum."

* * * * * * * *

"Many illustrations could be given of how valuable specimens are stolen from the mines, and done so under the very noses of the officials: A case in point occurred at one of the leading 'Golden Mile' producing properties only the other day. A., employed as miner underground, managed to pass a quantity of valuable ore on to B. (his mate, working on the surface tip) by secreting the stone in a truck of mullock; C., a confederate, strolled up to the bottom of the tip at dusk, and apparently ignoring the presence of B. on the platform above, commenced to fossick among the mullock. He was ordered off by B., and on his refusal to go away a heated altercation ensued. This terminated in C. picking up a small stone and aiming it at B., and the latter retaliated by promptly but carefully picking the lumps of specimen ore from out of the truck and throwing them aimlessly in the direction of C., who, having first dodged the flying missiles, leisurely filled his pockets with the pelted specimens and went on his way rejoicing, while B., who remained behind to complete his shift, quietly sniggered at the success of the ruse adopted to rob the company who employed him of its gold."

By this and similar deeds of cunning, which, if space permitted, could be cited in detail, the mining companies are declared to be robbed of thousands of pounds monthly.

NEW JERSEY FIRE-BRICK.

Fire-brick are manufactured extensively at Woodbridge, Perth Amboy and South Amboy, in New Jersey, which are adjacent towns, situated on Staten Island Sound. The first grade of fire-clay dug at these points is composed approximately of 46.9 per cent SiO_2; 35.9 Al_2O_3; 1.1 Fe_2O_3; 0.44 alkalies; 12.8 combined water; 1.5 moisture, and 1.3 TiO_2; total, 99.94 per cent. In refractoriness it ranges from Seger cone 33 to cone 35 (1790° to 1830° C.). The No. 2 fire-clay corresponds to cones 27 to 30 (1670° C. to 1730° C.). These data are reported by Prof. Heinrich Ries in a paper read at the Albany meeting of the American Institute of Mining Engineers. The New Jersey clays are of good plasticity, but low tensile strength. Some of the No. 1 clays crack in burning, and therefore can be used only to a limited extent in the fire-brick mixtures. In the manufacture of New Jersey fire-brick the clay is commonly tempered in ring-pits and molded by hand or in soft-mud machines. A few manufacturers employ the stiff-mud process. After molding, the brick are re-pressed and burned in down-draft kilns at a temperature between Seger cones 10 and 12 (1330° to 1370° C.). The range of composition and fusion temperature of New Jersey fire-brick are shown in following table:

	SiO_2.	Al_2O_3.	TiO_2.	Fe_2O_3.	CaO, MgO, Alk. By Difference.	Cone of Fusion.	Temperature.
1....	77.30	18.99	1.05	2.06	0.60	31—32	1760°C.
2....	82.45	14.86	0.90	1.54	0.25	32	1770
3....	68.70	26.50	2.65	1.25	0.90	27	1670
4....	77.15	19.46	0.95	1.99	0.45	27	1670
5....	82.30	14.84	0.71	1.70	0.45	31	1750
6....	75.20	21.09	1.72	1.37	0.62	33	1790
7....	77.70	19.51	1.86	1.11	...	28—29	1700
8....	79.84	18.06	1.53	1.65	...	31	1750

The comparatively low fusion temperature of many of these brick is due, not alone to the fluxing impurities, but in a large degree to the ratio between the silica and the kaolinite base, and the presence of titanic acid, which acts as a stronger flux than silica. However, many of the New Jersey fire-brick bear an excellent reputation and are found to stand frequent and great changes of temperature better than other bricks. They are used extensively in blast furnaces, kilns, cupolas, etc., with good results.

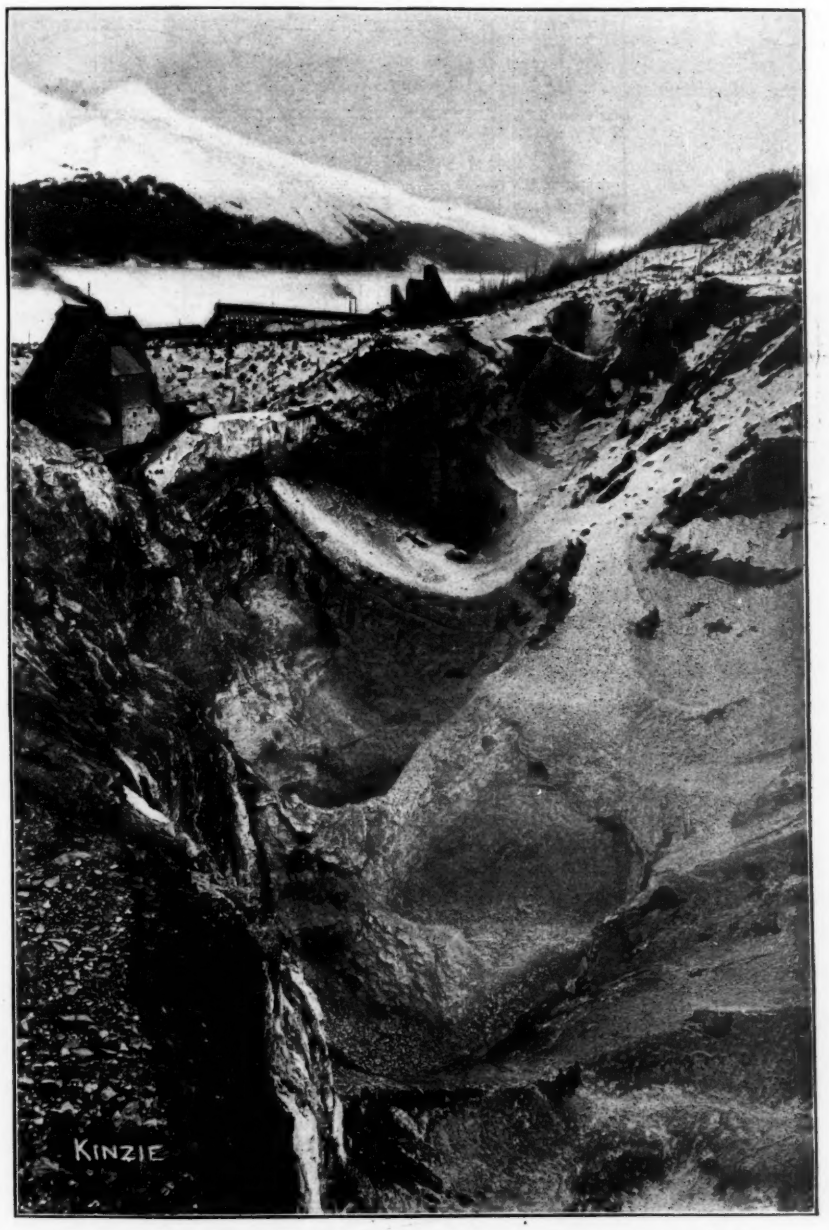
MINING AT THE ALASKA TREADWELL*

By ROBERT A. KINZIE.

Geology.—Before taking up the subject of the underground mining in detail, it would be well to give a brief description of the geological features that bear on the economic extraction of the ore. While the geological conditions are the same in the Treadwell, Mexican and Ready Bullion mines, there are conditions due to faulting, shape and the position of ore-bodies with regard to salt water, that have a great influence on the methods and costs of mining.

The deposit lies at a slight angle to Gastineau channel. The hanging-wall of the Treadwell deposit is at a distance of 1,000 ft. from the present locality is a carbonaceous slate, in which the original lines of bedding and principal cleavage coincide. It can be traced for miles both to the north and south. Its strike is N. 50 deg. W., being practically the same as the ore-bodies and of Gastineau channel, and coinciding with one of the two fissure-systems which affect nearly the whole of the Alexander archipelago.

Following the disposition of the slate came the intrusion of the syenite. This dike is extremely irregular in shape. In the Treadwell mine it has a width of 420 ft.; going southeast it narrows down to a mere stringer until the Mexican mine is reached, where it again swells out to a width of 150 ft. From the Mexican to the Ready Bullion, a distance of 2,500 ft., it is traced with difficulty on account of



OPEN CUT, ALASKA TREADWELL MINE.

shore-line, while that of the Ready Bullion lies for the most part under tidal water.

According to Prof. Becker, who undoubtedly had an excellent opportunity of studying the formation and character of the ore-bodies, this deposit represents the upper portion or "feather-edge" of an intrusion of sodium syenite, or, more logically, an albite diorite, which, owing to peculiar conditions, has been decomposed and silicified by solfataric or hydrothermal action, causing a concentration of gold in the native state and in the pyrite sufficient to make it profitable mining. The country-rock in this faulting and the broken character of the country. At the Ready Bullion it again attains a width of 300 ft.

The next intrusion, that of the gabbro, was of fundamental importance in the formation of the ore. Accompanying and following this intrusion came the mineralization of the syenite and the deposition of the ore. The dike of gabbro forms the hanging-wall of the deposit, and varies in width from 8 ft. in the Mexican to several hundred at the Ready Bullion. In places the gabbro is badly shattered and contains numerous stringers of quartz; but these are mostly barren, and nowhere is the gabbro converted into ore. This dike can be traced the full length of Douglas Island.

The third and last of the intrusions was what Becker has called an analcite-basalt. This strikes N. 20° W., cutting the slate, syenite and gabbro, and dips to the west at an angle of 86°. Preceding and during this eruption, the country-rock was evidently badly shattered, and the fissures thus formed filled with auriferous material. In no place does the basalt dike contain ore. In the upper levels it is quite continuous, but on the lower levels each dike has split into several smaller ones, which in places enclose fragments of the syenite.

In the Treadwell, 700-Foot and Ready Bullion mines, and in the west end of the Mexican, the ore consists of the mineralized syenite. This ore is readily devisible into two distinct varieties. The one consists of stringers of quartz and calcite, occupying the spaces formed by the crushing of the syenite, the syenite itself being somewhat mineralized along the planes of fracture. The other consists of syenite which has been crushed and broken by dynamic agencies, and the fragments thus formed have been saturated by the mineral-bearing solutions.

In the east end of the Mexican mine—particularly in the lower levels—the ore consists of auriferous quartz and calcite, occupying lenticular spaces in the black slate formed by its yielding to pressure along its cleavage-planes. The value of the ore can be readily determined by the quantity of pyrite contained and its distribution—whether uniformly or in bunches—the latter being the best. In the upper levels the best ore lies next to the black slate footwall, but in the lower levels it has traveled toward the hanging-wall, and the space occupied by good ore above is here replaced by practically barren syenite.

Shafts.—The Treadwell, 700-Foot and Mexican mines are opened by vertical shafts, but the Ready Bullion by an incline. In every instance the ground is of such a nature, except near the surface, that timbering would be unnecessary were it not required as a support for the skip-guides, ladders, pipes, etc.

TABLE I.—*Dimensions of Shafts.*

Name of Mine.	No. of Comp'ts.	Vert. or Incline.	Size of Timber.	Gal. Water Per Min.
Treadwell	4	Vert.	8″x8″	50
Mexican	3	Vert.	8″x8″	20
Ready Bullion ...	3	Incl.	8″x8″	80
700-Foot	3	Vert.	8″x8″	50

Table I gives the size of the main working-shafts. All of these are rectangular, and are sunk by machine drilling. Each mine has in addition from one to three smaller shafts, sunk for prospecting, which vary in depth from 150 to 400 ft. With the exception of the No. 1 Shaft of the Treadwell, they are not used for handling ore.

All shaft-sinking is done by contract, and if possible the contract for all work on the lowest level and for the shaft is let to the same parties. These contracts include the sinking, hoisting from the shaft, driving of drifts, tramming, etc.; or, in other words, the company furnishes steam, air and tools, and there its liability ends. Two machine drills are usually employed for sinking. Two sizes have been tried, and the larger, or the new Ingersoll machine —diameter of cylinder, 3⅝ in.—has been found superior to the 3¼-in. machine formerly used. The rock is quite hard, particularly on the hanging-wall side of the deposit, and it has been found that the number of feet drilled with the large machine is fully 30 per cent more than with the smaller one.

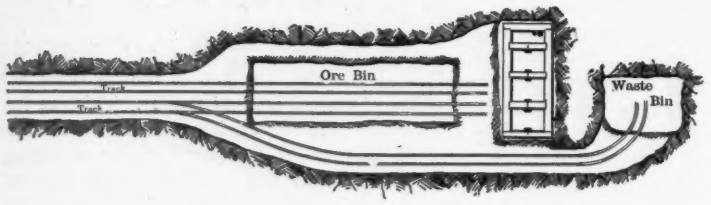
Both 10 and 8-hour shifts were tried, and the best progress made with the former; consequently, all shafts, as well as other underground work, are done by 10-hour shifts. The center-cut system of drilling is employed. The cut is first drilled, blasted and mucked out, then the other holes are drilled and blasted and the dirt removed in the usual manner; save that the end-holes are reserved, and fired with the cut-holes of the following round.

Although the shafts vary from 700 to 900 ft. below sea-level, and one of them is under the channel, very little water is encountered in sinking. Most of the water in the mines comes from the surface, and is caught up and pumped out, usually from the first level. The water underground does not average over 50 gallons per minute, and this is handled either

*Abstract from paper entitled "The Treadwell Group of Mines, Douglas Island, Alaska," by Robert A. Kinzie, Assistant Superintendent, Treadwell City, Alaska. *Transactions* American Institute of Mining Engineers, October, 1903.

by the skips or by No. 5 Cameron sinking-pumps.

Cross-head and buckets are used for sinking. The bucket is flat-bottomed, with the sides projecting 2 in., thus giving it a more secure base and permitting it to remain upright on an uneven surface while being filled.



PLAN.

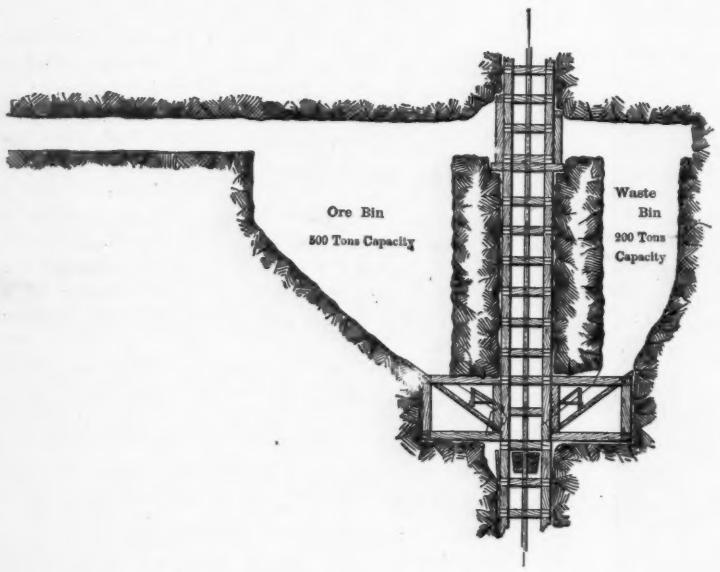


FIG. 1—SECTION.

At the Ready Bullion mine the ore-body lies for the most part under water. For this reason a vertical shaft would be impracticable; therefore an incline shaft was started at a point 160 ft. from the footwall and sunk at an angle of 47° 53′ from the horizontal. To protect the underground workings from the sea, a pillar 300 ft. thick was left in place above the highest workings in the main ore-body of the mine. The ore was cut at a distance of 728 ft. along the incline, and the shaft continued to the 750-ft. level.

Stations and Ore-Bins.—Formerly, it was the custom to open up a level every 110 ft., but below the 440-ft. level, the distance between levels in the Treadwell will be 150 ft. from now on. By this method a large development-expense will be avoided.

At each level a station is cut out, the width of the shaft, from 40 to 60 ft. long and with an average height of 8 ft. In the Treadwell the main crosscuts run parallel to the wall-plates of the shaft, and as far as possible it is aimed to have the station

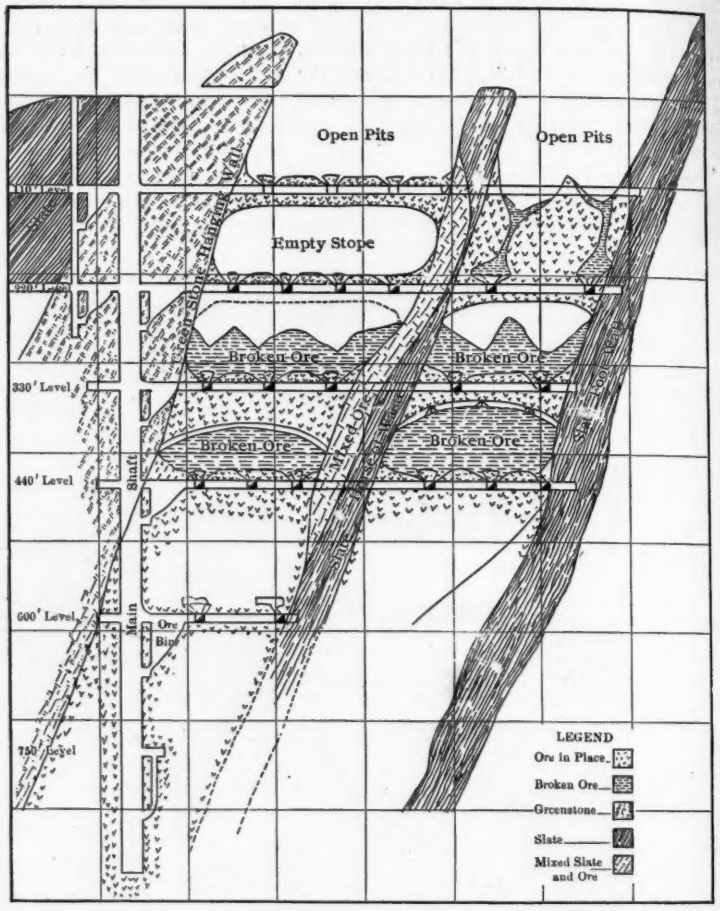


FIG. 3.

The question of light at the bottom of a shaft has always been a vexatious one, owing to the water and blasting; but this question has been solved by using a group of three 36-c. p. electric lamps in the place of torches or candles. The wire is brought down the shaft to some convenient point, where a small reel is placed with which the lamps can be lowered or raised at will. It has been found that the best wire to use is the ordinary lamp-cord, wrapped with heavy canvas and given a good coat of P. & B. paint.

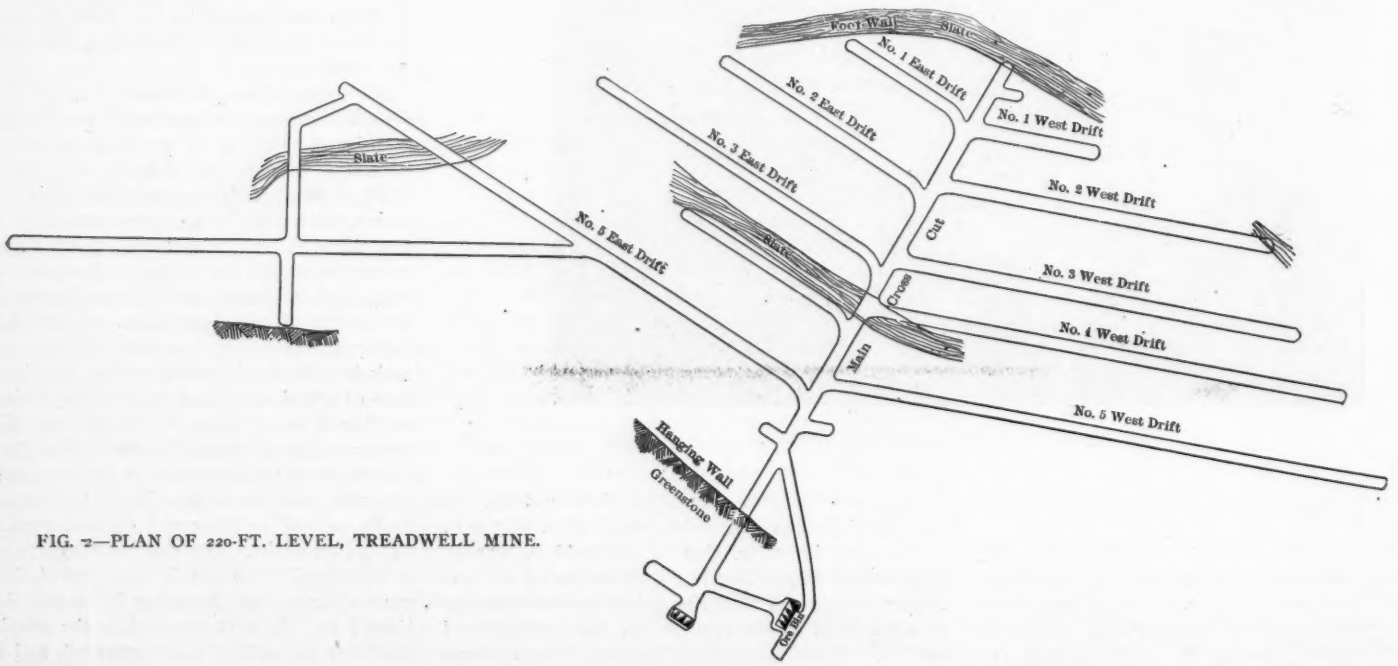


FIG. 2—PLAN OF 220-FT. LEVEL, TREADWELL MINE.

In the meantime the footwall had become much steeper, and it was evident that if the shaft was continued at the same angle, it would soon be out of the ore. The shaft was then gradually steepened until at the 900-ft. level it has an inclination of 80°, and the shaft continues at this angle to the next lower level.

on the side opposite from that toward which the skips dump. When the station-level is reached in timbering the shaft, a station-set is put in. This set is 14 ft. high, and is tied in two directions by iron bolts. To protect the front wall-plate that serves for the sill of the station, a stull 10 by 14 in. is put in between the wall-plate and the edge of the sta-

tion, and the two securely bolted together. In cutting out the station, a drift is run from the shaft a distance of 25 ft. It varies in height from 15 ft. in front to 7 ft. at the back, and is the width of the shaft. The main cross-cut is then started at right angles to the station-drift. For the first 80 to 100 ft. this cross-cut has a width of 20 ft., and from there to the footwall it is 12 ft. wide. At the hanging-wall end of the cross-cut a station is cut for the winding-engines that operate the tail-rope haulage, and directly opposite the sinking-compartment, on alternate levels, a station is cut for the sinking-hoist. Beneath the floor of each station an ore-bin is cut out with a capacity of from 500 to 1,500 tons, according to the amount of ore to be handled. Experience has shown that it is very convenient to have large storage capacity at the stations, and when the ore-bin is in the ore it is just as economical to cut a large as a small one.

In the Mexican and 700-Foot mines, the main cross-cuts start directly from the shaft, and as a consequence the station-cutting is much simplified. In other respects they follow the same system as the Treadwell, with the exception that the ore-bins are smaller, and in the Mexican two bins are cut—one for ore in front of the shaft, and one for waste, cut on the opposite side of the shaft and reached by an extension of the main cross-cut. (See Fig. 1.)

In the Ready Bullion mine the above methods are used, but are changed in so far as to make them applicable to an incline-shaft, with the further exception that the main cross-cut runs to the hanging-wall. In cutting out the ore-bins two methods are employed. The old one consists of putting up a raise from the chute station to the level, and after the chutes have been built to cut out around the raise from the level of the cross-cut until the bin is of the desired dimensions. By this method the rock is broken into large pieces and has to be "bull-dozed" with powder and drawn out before the work of drilling can be continued. The second method is to put up a raise from the chute station to the small drift from the shaft at the station level, then build in the chute and stope out a room the size of the bin. The stope is carried to the level of the top of the main cross-cut, thus saving the expense of from 40 to 50 ft. of cross-cutting. At the same time it protects the timbers of the shaft from flying rock by leaving a small pillar between the ore-bin and the shaft, which can be removed when the bin is finished and the face of the cross-cut sufficiently far away to insure the shaft-timbers from being broken when the cut is blasted. The system of stoping is the same as that employed in the large stopes.

Levels (Drifts, Cross-Cuts, Winzes, Etc.).—When the ore-bin and station are completed, the main cross-cut is driven to the footwall. It thus serves the double purpose of determining how the level can be developed in the most economical way and of permitting a thorough sampling of ore, so that a fair idea of its value can be obtained. The following rule is almost axiomatic in its applicability to the ore-bodies on the island: *Start the first drift along the footwall, and keep it there.* At various times the above rule had been ignored, and always with the same result. The ore-body is subject to abrupt changes in the strike and dip of the footwall. It is imperative that the ore be drawn from the stopes by gravity, and this cannot be applied to the ore along the footwall unless the chutes, and, consequently, the drifts, are kept as close to it as possible. Fig. 2 shows the plan of the 220-ft. level of the Treadwell mine. On this level the slate-horse in the center of the deposit is quite small, and therefore more drifts than usual are required. On the lower levels, where the slate-horse is wider, it is left in place and forms a natural division between the hanging and footwall portions of the ore-body. At intervals of 25 ft. raises are put up on alternate sides of both the main cross-cuts and drifts. These raises are 15 ft. high and are designed to accommodate the chutes for drawing the ore from the stopes. They are put up while the drift is run, and given a slope of 60 deg. from the horizontal so that the ore will run freely in them. In the Treadwell, Ready Bullion and 700-Foot mines, the drifts and chute raises are in ore; but in the Mexican, on account of the flatness of the vein, they are run in the footwall slate, and the chute-raises put up to the ore at an average height of 20 ft. above the track. At the same time as the main drift and the chute-raises are being run, a second drift, called the intermediate, is driven directly above the main drift and separated from its back by a pillar of rock 10 ft. thick. This drift is the same size as the lower one, and is so driven that it connects with the top of each chute-raise as it progresses.

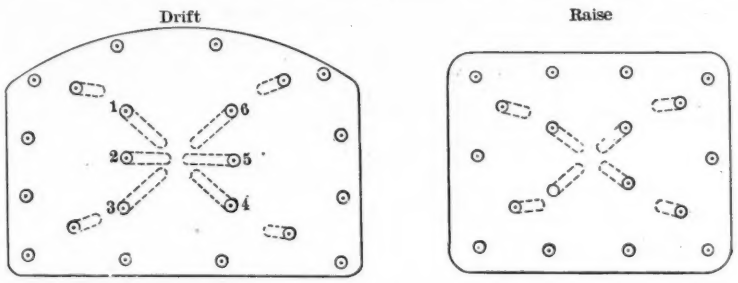


FIG. 3.

At the ends of the main cross-cuts, and at intervals varying from 200 to 500 ft. along the deposit, the different levels are connected by winzes. These winzes are used as man-ways and as a medium of ventilation. It might be well to add that they are generally raised from the lower level, and under no circumstances is a winze sunk unless it is absolutely necessary. While running the main drifts and cross-cuts close attention is paid to the grade. The standard grade in all the mines is 0.005 per cent. This grade favors the loaded car going to the station, while it does not retard it too much on its return trip. Cross-cuts are used for connecting the various drifts and for prospecting. They are the same size as the drifts. When used for the first purpose they are at the level of the drift, but when the second object is the incentive, they are usually driven from the level of the intermediate, so that the broken rock can be stored and handled through chutes. The usual size for drifts, cross-cuts and intermediates is 10 by 7 ft. in the clear, and for raises 6 by 8 ft. in the clear, no timber being used.

As a usual thing, the rock is quite uniform in texture, and without seams or slips, to break to. This makes it extremely difficult for the holes to break to the bottom. The sketches, Fig. 3, show the scheme of drilling a round in a drift and a raise, and it is the result of several years' trials.

All work is done by machine-drills, two sizes being used. For drifting and cross-cutting, the new Ingersoll—diam. of cylinder, 3⅝ in.—is very satisfactory; and for raising, the Ingersoll-Sergeant machine, diam. of cylinder 3¼ in., is preferable, on account of its lightness and durability.

TABLE II.—*Showing Cost of Mining on Douglas Island, Alaska.*

(Per Ton of Ore Milled.)

Name of Mine.	Machine-Drilling.																		Rock-Breaking.							
	Tool-Sharpening.			Supplies.					Compressed Air.				Explosives.							Explosives.						
															Powder.							Powder.				
	Labor.	Supplies.	Total.	Labor.	Merchandise.	Iron and Steel.	Repair-Labor.	Total.	Labor.	Steam-Power.	Supplies.	Total.	Fuse.	Caps.	70 Per Cent.	40 Per Cent.	Labor Primers.	Total.	Labor.	Supplies.	Fuse.	Caps.	70 Per Cent.	40 Per Cent.	Labor	Total.	Total.
Treadwell	.0191	.0048	.0239	.2280	.0050	.0192	.....	.0242	.0032	.0293	.0082	.0407	.0030	.0018	.0079	.0656	.0042	.0825	.1643	.0037	.0070	.0042	.1233	.....	.0099	.1444	.3124
Mexican	.0322	.0057	.0379	.2720	.0058	.0209	.....	.0267	.0031	.0572	.0245	.0848	.0028	.0012	.0175	.0822	.0056	.1093	.2137	.0037	.0067	.0029	.0916	.....	.0132	.1144	.3318
Ready Bullion	.0400	.0107	.0507	.2521	.0015	.159	.....	.0174	.0029	.0882	.0064	.0975	.0027	.0012	.0154	.0709	.0063	.0965	.1439	.0041	.0064	.0029	.0874	.....	.0148	.1115	.2595

Name of Mine.	Tramming.					Hoisting.				Explosives.					Illuminants.					Total Costs.											
												Powder.					Electric Light.															
	Labor.	Steam Power.	Horses.	Supplies.	Total.	Labor.	Supplies.	Steam-Power.	Total.	Labor.	Fuse.	Caps.	70 Per Cent.	40 Per Cent.	Total.	Labor.	Candles. Oil.	Labor.	Supplies.	Total.	Labor.	Supplies.	Iron and Steel.	Foundry.	Electric Light.	Hauling Supplies.	Repairs.	Assay.	Power.	Personal.	Powder.	General.	Total.
Treadwell	.0262	....	.0042	.0055	.0359	.0170	.0023	.0293	.0486	.0141	.0100	.0060	.1312	.0656	.2269	.0010	.0072	.0002	.0001	.0085	.4796	.0504	.0360	.0012	.0003	.0021	.0080	.0015	.0586	.0039	.1966	.0017	0.8399
Mexican	.0185	....	.0023	.0066	.0274	.0448	.0014	.0572	.1034	.0188	.0095	.0041	.1091	.0822	.2237	.0006	.0130	.0010	.0003	.0149	.6465	.0419	.0348	.0008	.0013	.0022	.0102	.0027	.1144	.....	.1913	.0129	1.0590
Ready Bullion	.0325	....	.....	.0005	.0330	.0194	.0048	.0882	.1124	.0211	.0091	.0041	.1028	.0709	.2080	.0004	.0092	.0005	.0003	.0104	.5671	.0315	.0357	.0006	.0008	.0016	.0057	.0024	.1763	.....	.1737	.....	0.9954

NOTE.—The costs for the Treadwell mine are from May 31, 1901, to May 31, 1902, and for the Mexican and Ready Bullion mines from December 31, 1901, to December 31, 1902. Tons milled: Treadwell, 682,893 tons; Mexican, 207,455 tons; Ready Bullion, 226,522 tons.

The cut holes from No. 1 to No. 6 are drilled 6 ft. deep, and are so pointed that they come to a common apex at the center. The next row of holes, called the relievers, are drilled 5 ft. deep and given a slight rake toward the center. The outside holes, or trimmers, are also drilled 5 ft. deep, but are given a small outward angle. The cut is first blasted with No. 1, or 70 per cent powder; the relievers and trimmers are then blasted separately, No. 2, or 40 per cent, powder being used in each case.

The position of the blasting holes, both in the drift and in the up-raise, is shown in Fig. 4.

Stoping Surface-Pits.—By reference to the tables of the report it will be seen that considerably more than 75 per cent of the ore mined from the Treadwell has come from the open or surface-pits. From now on the percentage from the underground workings will become greater each year. The main open-pit, or "Glory Hole," has reached a depth of 220 ft. below the adit level and 450 ft. from the surface, with a maximum width of 420 ft. and a length of 1,700 ft. Owing to the large slides of waste rock from the footwall, and the necessity of having a secure pillar of rock at the 220-ft. level to protect the underground workings from surface-water, it is impracticable to carry the pits to a greater depth. In the other mines, at present, very little ore is being taken from the surface, but at the beginning all of them depended on the open pits for ore on which to start their mills. When a pit is to be opened a raise is put up from the nearest level and connected with the surface. This raise is started from the intermediate drift, in general directly over a chute-raise. The chutes on each side then serve as a man-way for the raise in course of erection, and the broken rock is drawn off through the middle chute-raise into cars. When the raise has been connected, machine drills are put to work cutting out a small stope at the bottom. This raise when finished has the shape of an hour-glass, the top being formed by the open pit and the bottom by a stope, covering three chutes and from 20 to 30 ft. high, the two being joined by the raise. The object of cutting out the pit-raises in this manner is, first, to obtain chute-capacity in case of their being hung up by large pieces of rock or by blasting; and, second, to afford an opportunity to break up any large piece of rock that may have been overlooked in the pit, which would stop up the chute unless it were broken to pieces small enough to pass through it.

Machine drilling is seen at its best in these pits. The 3¼-in. diam. Ingersoll-Sergeant drills, set on tripods, are used in all the pits at present. The average number of feet drilled per machine in 10 hours is 36.35. The holes are drilled to an average depth of 12 ft., and each machine will break 69.69 tons of ore per shift of 10 hours. When the pits were smaller, and the difficulty of setting up was not so great as at present, the average number of feet drilled was much higher, and the breaking capacity of a machine drill was from 150 to 200 tons of ore per shift of 10 hours. The pits are worked by drilling and blasting the ore from a series of benches or terraces around the chute-raise as a center, and when the ore is blasted the broken rock rolls down to the bottom. The small pieces are then broken by sledges, and the larger ones by placing sticks of powder on the surface of the rock, tamping with a little fine dirt, and blasting. For blasting holes, No. 2, or 40 per cent, dynamite is used, while for "bull-dozing" No. 1, or 70 per cent, is the best.

When the rock has been broken to the required size it is drawn off, through the raises and chutes described above, into cars. These cars are hauled to the station ore-bins by horses, or by endless-rope haulage, where they are dumped. The ore is then loaded into skips, hoisted to the surface, and handled in the usual manner.

Underground Stoping.—The future economic workings of the mines depends on no one factor more than on the success attending the carrying of the present system of stoping to the lower levels of the mines. The surface-pits are practically exhausted, and the value of the ore does not allow of timbering or any extensive method of filling. So far, the present method has proved applicable to the lowest levels, and I do not hesitate to say that it will be equally successful at any depth to which it may be desired to carry it.

It was explained above that the object of the intermediate drift is to open communication with the ore-chutes and to furnish a large facial area for the machine-drills to work upon, in cutting out or undercutting the ground-floor for the stopes. When the intermediate has advanced about 50 ft., the work of cutting out the stope is started. This consists of mining out a chamber 7 ft. high, from 150 to 300 ft. long, and with a width varying with the width of the ore-body. In the past it has been customary to cut out the stopes with a level floor, but experience has shown that it is more economical to cut the floor so that it slopes from the parallel lines of chutes at an angle of about 30°. This does away with a large amount of shoveling, and the ore thus left is ultimately obtained through the stopes from the next lower level.

When the ground-floor has been cut out, the work of stoping upon the ore is immediately begun. The roof of the stope is arched, thus serving the double purpose of supporting the back and offering a better surface for the attack of the machine-drills. The ore is shot down in large, thin slabs, so that the shock of falling, combined with that of the blasting, breaks it up as much as possible. The pieces of rock too large to pass through the ore-chutes are broken by hand and "bull-dozed" with powder to the required size. When starting from the floor, the machine-drills cut out a trench along the center of the back to form the arch, its height varying with the character of the rock. Two sizes of machine-drills are used: the 3¼ and 3⅝ diam. Ingersoll-Sergeant, and the holes drilled to an average depth of 8 ft. A machine-stoping will drill an average of 28.69 ft. per shift of ten hours and break 34.96 tons of ore with the consumption of 12.53 lbs. of No. 2 dynamite. The cost of breaking up the rock after it has been blasted down is a large item in the expense of stoping. One rock-breaker is usually required to each machine, and it takes 0.85 lb. of powder for "bull-dozing" for each ton of rock broken.

As no timber is used, it is compulsory that a sufficient quantity of broken ore be left in the stopes to form a solid working-floor for the miners. It has been found that one-third of the broken ore can be drawn off while the stope is being worked, and the surface of the broken ore kept within working distance of the back. In other words, by the above methods, two-thirds of the ore broken must be left in the stope, and cannot be drawn off until the stope is worked up to the next higher level and finished. In the Treadwell and Ready Bullion mines the slate-horse forms a natural division between the stopes of the north and south ore-bodies. The walls of the ore-body are supported by vertical pillars, or ribs,

MAP OF HEIDELBERG DISTRICT, TRANSVAAL.

15 ft. thick, and from 200 to 300 ft. apart. For means of communication and ventilation, man-way raises are put up in these pillars and connected with the levels. At intervals of 25 ft. short drifts are run in opposite directions from the man-way raise; so that, as the working-floor of the stope advances, each of them is used successively when the workings connect with the main raise, and in turn abandoned and closed up as connection is made with the next higher one. The levels are protected by horizontal pillars from 20 to 30 ft. thick. Heretofore these pillars have been left at each level, but from now on only the pillars at every other level will be left in place; yet even with this saving fully 20 per cent of the ore must remain in the mine in the shape of pillars and ribs to support the ground and prevent caving.

DEVELOPMENTS IN THE HEIDELBERG DISTRICT, TRANSVAAL.

By T. LANE CARTER.

About 35 miles southeast of Johannesburg, on the railroad line to Durban, is the town of Heidelberg, the center of the Heidelberg mining district. The past history of this district has been disappointing, although just now the outlook is better, as considerable prospective work is being carried out by different syndicates.

Going on past results only, the outlook is not bright. There is but one really successful mine in the district, and that is the Nigel. This mine is plainly marked on the map. The only other two properties worth considering are the Molyneux mines (reconstructed of late as the Nigel Extension) and the Heidelberg Roodeport. The Molyneux mine is on Botha's Kraal, while the Heidelberg Roodepoort is about 29 miles away, near the farm Hex River. It will be seen that there is a considerable distance between these three mines. The Nigel is a successful mine; the Molyneux with proper management would have been a success; the only failure is the Heidelberg Roodepoort. It is not fair, the people hold, to damn the district on the work of the past They claim that, as yet, they have not had a fair show.

It is rather difficult for geologists to correlate the reefs found in this district with the reefs of the Central Rand, although it is held that they will be so correlated when sufficient data are obtained. In past years what is known as the Nigel reef has received most notice. A glance at the map will show the broken character of the Nigel reef. There are many faults and breaks, and in some places it is impossible

PANNING ON THE VELDT.

to follow the contortions at all. Some authorities hold that the Nigel reef forms a small syncline of its own.

One of the most talked of concerns during the past months is the Coronation Syndicate, whose work in the Heidelberg district has been on a large scale. People realize that if the favorable reports circulated are true, a valuable property will be added to the producing mines of the Witwatersrand. This syndicate has devoted its attention to the country in the immediate vicinity of the Hospital Hill shales, the great landmark in the Witwatersrand formation About four miles of a reef, named by them the Coronation reef, and claimed as a new discovery, has been opened up. At a spot marked E on the map, the syndicate claims it has a valuable mine. Although the reef thickness of this deposit is small, the assays from it are reported as very high. A good deal of work is being done at Edenkap, and it is looking very much like a mine just now. Active development is in progress, hoisting engines are being erected, houses are going up, etc. On other parts of the syndicate's holdings, active prospecting with the diamond drill is in progress. These holes are shown by ⊙ in the sketch.

The reported success of the Coronation Syndicate put a high value on all the farms running approximately parallel with the Hospital Hill shales for it is held that the reef will extend for miles The Boer farmers in many cases put a high price on their holdings, and options are now expensive. A fine piece of reef was found recently on one of these farms, but barren of gold. To the engineer who informed the Boer that the reef was useless, the farmer replied that there must be a mistake, as the Almighty would never have made such reef without putting gold in it.

Other syndicates have been formed, and active prospecting will be carried out. So great is the demand for diamond drilling that the contract price per foot has gone up. At present the prices for put-

IN CAMP.

ting down bore-holes vary from 35 to 40 shillings ($8.40 to $9.60) per foot. All the prospectors are very hopeful. They believe that the future is practically assured. If the visiting skeptic tells them that most of the mining experts have little confidence in the Heidelberg district, the reply is, "If there was no difference of opinion there would be no horse-racing."

The three bore-holes being put down by the Coronation Syndicate at Blinkpoort 208 (see map) are being watched very keenly by all claim-holders in the district, as this spot is looked upon as the key to the situation. Should payable reef be found, a big tract of country will be proved.

Prospecting in this district is carried on at a disadvantage. Simply running trenches across the formation will not do, for the reefs, if present, are generally covered over by a deposit of soil, drift, etc., unless the outcrop is on a mountain side. Some sections are also covered by a recent formation of diabase, several hundred feet thick. It is necessary to use the diamond drill freely, which is expensive. Trenching was tried for a long time, but it is now abandoned, save in rare cases. The old superstition of the prospector, the divining rod, is not unknown in this district.

The Coronation Syndicate has taken much trouble to correlate the reefs with those of the Central Rand. There are certainly many facts which justify the assumption. Take, for instance, the country along the line A, B. It is impossible to distinguish between the Hospital Hill shales at this point and the shales of the Central Rand. To the east of the shales, conformable beds of quartzite are found; then a conglomerate bed, and finally the formation of granite. This sequence is the same as at Johannesburg Crossing the Hospital Hill shales toward B, one meets a characteristic landmark, the black bar, also found in the Johannesburg section. This bar forms the footwall of the Coronation reef. The long stretch of country from the black bar to Heidelberg has been indifferently prospected with a few trenches but nothing was found. There is no question that the

EXAMINING AN OUTCROP.

diamond drill is required here to thoroughly test the country.

At the hole marked D, near Heidelberg, a strike was made a few days before the writer's visit. The result gives payable stuff, the total thickness being 29 in. with a value of 30 dwt. It is the opinion of some that this reef (a bit of whose outcrop is shown dotted on the Town Lands) is the Kimberley reef, well known as a large, unpayable auriferous bed in the Central Rand.

Unfortunately for the district the shares of the different syndicates have been put up to high figures; that of the Coronation Syndicate, for instance, having nearly touched £3,000, when £1,000 is probably a high price. The running of mines and prospecting ventures for the stock market, instead of making the stock market subservient to the mines, has ruined many a more promising district than around Heidelberg. Even now there are propositions on the Nigel reef that would pay well if a small capital were raised to erect a battery of 15 stamps, and these small mines were run without any regard to the stock exchange. Instead of this cautious management, these mines are floated with a big capital, too large a plant is erected for the narrow reef, the management tries new experiments, etc., and after a few months the mines close down, to the utter disgust of the shareholders, who thenceforward spread the report that the district is of no value.

It is as yet impossible to tell what the future of the district will be. From present indications, the reefs will be rather thin, and of high value. There will probably not be a big body of reef, like the main reef of the Central Rand, to warrant the erection of mills of 200 stamps. On account of this narrow reef, the area of each mine should be proportionately larger than the mines of the Central Rand.

As regards the important matter of water, the district is fortunate, for the watershed is good, and storage dams can be built large enough to supply all mines with water.

Another year should tell whether the dream of the enthusiasts, who declare that they see, in their mind's eye, flourishing mines spread out on the veldt. is a hallucination or not.

An electric charge possesses the most fundamental and characteristic property of matter, viz., mass or inertia; so that if any one were to speak of a milligram or an ounce or a ton of electricity, though he would be certainly speaking inconveniently, he might not necessarily be speaking erroneously.

A CONTINUOUS FILTER-PRESS.

BY AN OCCASIONAL CORRESPONDENT.

The Argo machine is a new departure which merits the attention of designers of cyanide plants. The working of the machine is simple. After agitation with cyanide the mixed slime and solution flow over a feed board onto a continuous traveling belt made of twilled filter-cloth. The belt passes over an aperture in a vacuum box into which the solution is sucked, leaving the slime on the belt in the form of a sheet of very stiff mud. At the delivery end of the machine this mud, assisted by a scraper, falls off in lumps. The belt then descends into a water trough where it is thoroughly cleaned by a revolving beater. It then passes through a pair of mangling rollers, and finally rises to the feed end of the machine clean and fairly dry.

It is essential that the filtering belt should travel freely without wrinkling or undue wear, that no slime should overflow at the sides of the belt, and that no air should pass under its edges into the vacuum box; also that the belt should be easily and quickly replaced when worn out. Each of these points has been carefully thought out. The cloth filtering belt is driven by a roller at the delivery end of the machine. To prevent any drag on it, due to the suction of the vacuum box there is interposed, between the cloth and the aperture of the box, another endless belt composed of cast steel box-links, so as to provide a large number of rectangular apertures over which wire-gauze is pinned and through which the solution passes after it has been sucked through the filter-belt. This is called by the makers the "box-link chain." It is driven at the same speed as the filter-cloth, and thus supports and carries it past the aperture of the vacuum box without any drag or strain. The lower surfaces of the box-links are so machined that, as they pass over the edges of the vacuum box, they form an air-tight joint. Above the filtering cloth there is, at each side of it, an endless traveling "clip chain" whose links are flat-faced clips. Just before the slime is fed onto the cloth these clips descend successively upon the edges of the cloth, pull them outward, flat and taut, and travel with them, holding them down until they are past the vacuum box, when they release them. The slime, when fed on the cloth, might flow laterally and get among these clips, but this is prevented by two endless rubber "deckel bands" which press against the edges of the cloth, traveling with it, from the feed-board to past the vacuum box, thus forming flanges which serve the same purpose as the flanges of a Frue vanner belt. These deckel bands partly project over the edges of the vacuum box, so are sucked down by the vacuum, thus making with the cloth a joint which prevents air from passing under the edges of the cloth into the vacuum box.

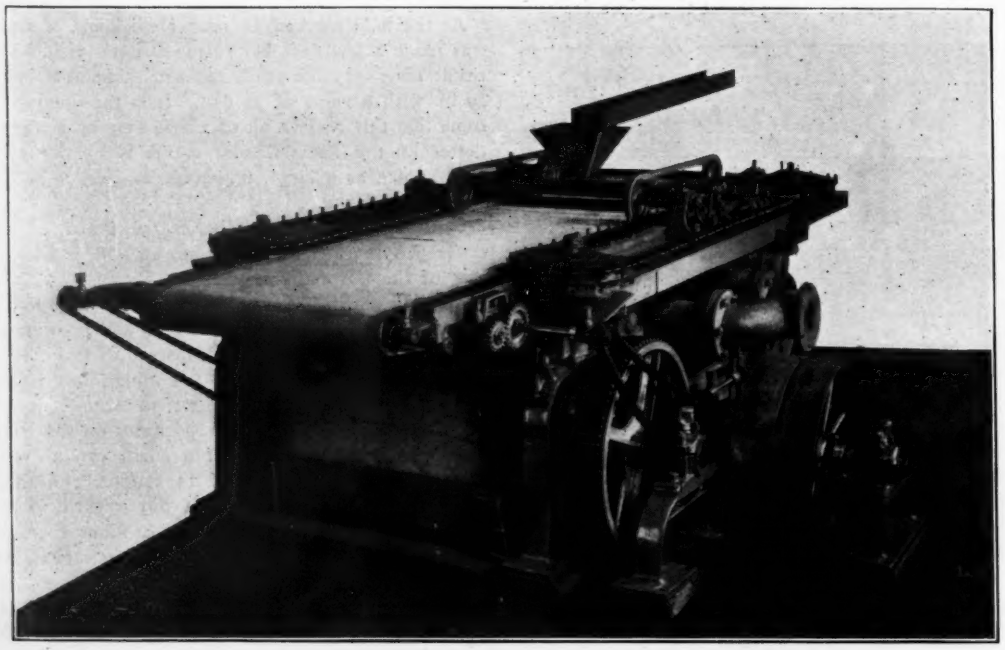
The endless filtering belt is 29 ft. long and 3 ft. 6 in. broad. Its ends overlap 2 in., and for this distance are coated with a rubber solution. To put on a new belt, one end is passed through the machine in the path along which it is to travel and brought back over the top of the machine to the point it started from. The solutioned ends are then laid one on top of the other, and a hot iron is passed over them. The joint is then beaten with a hammer to make it more solid, and when it is cool the machine may be started. The whole process takes about five minutes and it is claimed by the makers that a belt of twilled filter-cloth ⅛ in. thick should last one week, running night and day. The belt does not tear when worn, but wears thin, and, when old, passes a little solid matter into the vacuum box.

The vacuum (about 10 lb. to the inch) is maintained by a dry air-pump with a capacity of 400 to 500 cubic feet of free air per minute. The cyanide solution, after leaving the vacuum box, is separated from the air by two traps, and is then forwarded by a solution-pump to any required point.

For complete removal of cyanide solution of gold slimes, two machines are required, arranged tandem with a washing mixer between them. From the first machine the pressed slime falls off into an iron trough. Wash water is fed into the trough, and revolving arms mix the solid and fluid which then flow on to the second machine. The pressed slime falling off at the delivery end contains about 15 per cent moisture, and is stiff enough to be handled and trammed to a dump, or, if desired, may be sluiced off down a launder. With slimes rich enough for double treatment a third machine would be added, so that the first machine would extract the strong cyanide solution, the second would extract the weak solution, and the third the wash water, the three fluids being kept quite separate. Acid slimes from dams would first be neutralized in agitating vats, then passed over an Argo machine which would deliver them, with little moisture, to the cyanide agitating tanks.

Two machines with the intermediate washing mixer require 20 horse power, and, with a vacuum box aperture of 36 in. by 27 in., a vacuum of 10 lb. per square inch, and the filtering belt traveling 20 ft. per minute, have been found to deliver, per 24 hours, 150 tons of washed and pressed slime, containing from 13 to 15 per cent moisture. The makers claim that two machines, with an intermediate washing mixer, will treat 65,000 gal. of slime, containing 25 per cent solid matter, in 24 hours. The general design and workmanship of the machine are good, and the arrangements for altering the various adjustments are very complete and convenient.

The advantages of such a machine as the Argo are obvious. Compared with the decantation process as employed on the Rand, it would save the enormous settling tank accommodation required, would reduce the loss of cyanide and water thrown away with the residual slime, thus increasing the recovery of gold, and would save the construction of the residue-dams into which these slimes are at present sluiced. Compared with intermittent filter-presses, its advantage lies in its automatic and continuous working, giving a large output with less labor. The makers' tests of extraction were made on slimes from the Rand, running over 6 dwt. per ton, and an extraction of 75 per cent of the gold content was obtained by running the slimes, after agitation with cyanide, over only two machines as above explained. The addition of a third machine to the series should certainly increase the extraction, the increased cost being chiefly the power required for the extra machine.



CONTINUOUS FILTER-PRESS.

BOUNTIES ON LEAD MINED AND SMELTED IN CANADA.

The following is a copy of the Act passed by the Dominion House of Commons, with regard to the payment of bounties on lead contained in lead-bearing ores mined in Canada:

1. The Governor in Council may authorize the payment of a bounty of 75c. per 100 lb. on lead contained in lead-bearing ores mined in Canada, such bounty to be paid to the producer or vendor of such ores: Provided, that the sum to be paid as such bounty shall not exceed $500,000 in any fiscal year: Provided, also, that when it appears to the satisfaction of the Minister charged with the administration of this Act that the standard price of pig lead in London, England, exceeds £12 10s. sterling per ton of 2,240 lb., such bounty shall be reduced by the amount of such excess.

Payment of the said bounty may be made from time to time to the extent of 60 per cent upon smelter returns showing that the ore has been delivered for smelting at a smelter in Canada. The remaining 40 per cent may be paid at the close of the fiscal year upon evidence that all such ore has been smelted in Canada.

2. If at the close of any year it appears that during the year the quantity of lead produced, on which the bounty is authorized, exceeds 33,333 tons of 2,000 lb., the rate of bounty shall be reduced to such sum as will bring the payments for the year within the limit mentioned in section 1.

3. If at any time it appears to the satisfaction of the Governor in Council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor in Council may authorize the payment of bounty, at such reduced rate as he deems just, on the lead contained in such ores mined in Canada and exported for treatment abroad.

4. If at any time it appears to the satisfaction of the Governor in Council that products of lead are manufactured in Canada direct from lead ores mined in Canada without the intervention of the smelting process, the Governor in Council may make such provision as he deems equitable to extend the benefit of this Act to the producers of such ores.

5. The said bounties shall cease and determine on the 30th day of June, 1908.

6. The Governor in Council may make regulations for carrying out the intention of this Act.

7. Chapter 8 of the statutes of 1901, intituled "An Act to provide for the payment of bounties on lead refined in Canada," is repealed.

DRYING COAL.

The very successful application of coal-dust firing to the burning of cement in rotary kilns and the extensive use that this system is now finding in the American cement industry direct attention to the means for pulverizing the coal to the required degree of fineness. In order to pulverize coal economically and satisfactorily, it should not contain more than 1 per cent moisture. The pulverizing capacity of a mill is nearly twice greater with coal containing only 1 per cent moisture than with coal containing 2 per cent. This subject was discussed by C. O. Bartlett in a paper read at the recent meeting of the American Mining Congress at Deadwood, S. D. The moisture must be expelled from the coal without causing the coal to lose any of its volatile combustible. Two lots of coal will rarely dry alike, some coals giving up their moisture easily and freely, and others with difficulty. It appears that coals in which the ash is composed largely of silica dry easily and thoroughly, while those of which the ash is high in lime or clay are difficult to dry. It is very important to handle the coal in such way that warm air in large quantity be brought in contact with every particle of it, which is best accomplished by passing the current of air from the dried material through that which is wet. It is never safe to pass the fire-gases through the drying coal. The ignition temperature of coals is variable, as is also the temperature at which they will give off their volatile combustible. In general, coal can be safely delivered from the dryer at about 150° F. without loss of gas. At 225° F. there is likely to be a small loss of gas, and that temperature cannot be recommended as good practice. It is necessary to use a fan blast to produce a sufficient current of air to carry off the moisture. This will carry off 3 to 5 per cent of coal dust, which should be saved by passing the current into a brick-dust settling chamber, the walls of which will retain sufficient heat to prevent the moisture from condensing.

LAKE SUPERIOR TRAFFIC.

The total freight reported as passing through the Sault Ste. Marie canals, for the season up to October 1, was 26,893,820 short tons, of which 6,075,465 tons were west-bound, and 20,818,355 tons east-bound freight. As compared with the corresponding period in 1902, there was an increase of 580,898 tons in the total.

The mineral freights included were as follows, the figures being in short tons, except for salt, which is in barrels:

	1902.	1903.	Changes.
Anthracite	114,188	893,153	I. 778,965
Bituminous	3,455,608	4,642,588	I. 1,186,980
Total coal	3,569,796	5,535,741	I. 1,965,945
Iron ore	18,536,170	17,745,150	D. 791,020
Pig and man. iron	134,598	124,969	D. 9,629
Copper	85,060	76,359	D. 8,701
Building stone	30,332	9,640	D. 20,692
Salt, barrels	326,339	300,665	D. 25,674

The Cleveland *Marine Review* comments on this statement as follows: "A very heavy movement of coal to the northwest has certainly been the mainstay of lake commerce in the present season. This is proven by the Sault canal reports, the best index of lake commerce, which show to October 1 a gain in the freight movement as a whole to and from Lake Superior of only 580,898 tons (2,000 lb.), while the increase in coal shipments is 1,965,950 tons, of which 1,186,980 tons is soft coal and 778,970 tons hard coal. The Lake Superior coal shipments to October 1, 1903, included 4,642,588 tons of bituminous and 893,158 tons of anthracite, as against 3,455,608 tons of bituminous and 114,188 tons of anthracite on the same date in 1902. The increase in coal is, of course, largely due to the shortage that existed at this time a year ago. As showing the immediate effect of the recent strike of masters and pilots, it is noted that the Sault traffic for the month of September aggregated only 4,265,650 tons, compared with 5,403,808 tons in August, or a difference between the two months of 1,138,158 tons."

MINERAL PRODUCTION OF CALIFORNIA IN 1903.

State Mineralogist Lewis E. Aubury reports the yield and value of mineral substances of California for 1902 as follows, as per returns received at the State Mining Bureau, San Francisco, in answer to inquiries sent to producers:

	Quantities.	Value.
Asphalt ..... Tons	34,511	$349,344
Bituminous rock ..... "	33,490	43,411
Borax and boric acid ..... "	17,202	2,234,994
Cement ..... Bbl.	171,000	423,600
Chrome ..... Tons	315	4,725
Chrysoprase ..... Lb.	50	500
Clays:		
For pottery ..... Tons	67,933	74,163
For brick ..... M.	169,851	1,306,215
Coal ..... Tons	88,460	248,622
Copper ..... Lb.	27,860,162	3,239,975
Fuller's earth ..... Tons	987	19,246
Glass sand ..... "	4,500	12,225
Gold	.....	16,910,320
Granite ..... Cu. ft.	257,650	255,239
Graphite ..... Tons	42	1,680
Gypsum ..... "	10,200	53,500
Infusorial earth ..... "	422	2,532
Lead ..... Lb.	349,440	12,230
Lithia mica ..... Tons	822	31,880
Lime ..... Bbl.	448,664	369,616
Limestone ..... Tons	71,422	90,524
Macadam ..... "	500,939	418,548
Manganese ..... "	870	7,140
Magnesite ..... "	2,830	20,655
Marble ..... Cu. ft.	19,305	37,616
Mica ..... Tons	50	2,500
Mineral paint ..... "	589	1,533
Mineral water ..... Gal.	1,701,142	612,477
Natural gas ..... M. cu. ft.	120,968	99,443
Paving blocks ..... M.	3,502	112,437
Petroleum ..... Bbl.	14,356,910	4,692,189
Platinum ..... Oz.	39	468
Pyrites ..... Tons	17525	60,306
Quicksilver ..... Flask	29,552	1,276,524
Rubble ..... Tons	1,555,076	830,981
Salt ..... "	115,208	205,876
Sandstone ..... Cu. ft.	212,123	142,506
Serpentine ..... Cu. ft.	512	5,065
Silver ..... Tons	.....	616,412
Soda ..... "	7,000	50,000
Slate ..... Squares	4,000	30,000
Soapstone ..... Tons	14	288
Tourmaline	.....	150,000
Turquoise ..... Lb.	510	11,600
Total value		$35,069,105

In the previous year the total product was valued at $34,355,981, so that the increase for 1902 is $713,124.

The total value of the metallic substances, including precious metals for 1902, was $22,052,796, which includes gold, silver, mineral paint, quicksilver, copper, lead, manganese, platinum and chrome. The silver is given in commercial value, or amount received for it by producers. The Bureau has never independently collected statistics of precious metal output, but has used totals and distribution by county, as obtained at the United States Mint, San Francisco, where they have the advantages of verification by figures of receipts at Mint and assay offices and at private refineries and smelters throughout the United States.

The total value of non-metallic substances was $3,706,368, which includes borax, coal, chrysoprase, mineral waters, salt, asbestos, infusorial earth, gypsum, magnesite, pyrites, lithia mica, fuller's earth, quartz crystals, mica, soda, tourmaline and turquoise.

The total value of hydro-carbons and gases was $5,184,387, an increase of $1,651,678, including asphalt, bituminous rock, natural gas and petroleum. The gas is given in value of that commercially utilized. The petroleum price is the average per barrel, f. o. b. at the wells or stations in each county. The number of barrels of oil produced was 14,356,910, valued at $4,692,189, as against 7,710,315 barrels in 1901, valued at $2,961,102. The increase in value has not kept pace with increase in amount, owing to prevalence of low prices in the oil-fields, especially in the valley counties.

It is to be noted that for the first time since these detailed statistics were gathered three counties show a product of over $3,000,000 each. Shasta county, while showing a very material falling off in its total, is still in the lead. The decrease from the previous year is $3,007,522, which is owing to the lower prices for copper, and the prevalence of strikes at the leading producing mines, causing them to close down part of the year. Shasta owes its precedence to copper; Kern to its petroleum, and San Bernardino to its borax. While gold is still the leading mining product, its yield no longer puts the greatest gold producing country in the first place. Nevada county still leads in gold and silver ($2,149,564), though closely followed by Calaveras ($2,119,173); but when total mineral products are considered, Calaveras takes rank above Nevada county, the difference being caused by the value of copper produced in Calaveras. As usual, Shasta county still makes the largest yield of silver, owing to so much silver-bearing quartz being used as flux in the copper smelting operations.

As far as the "banner" counties are concerned in the different mineral products, the following is the record for 1902, with the values of the material in which the county leads: Alameda county leads in coal ($203,550); macadam ($182,295); manganese ($7,140); pyrites ($53,301) and salt ($160,000); Calaveras leads in mineral paint ($778). Colusa in sandstone ($87,456), El Dorado in slate ($30,000); Inyo in lead (9,013) and soda $50,000). Kern leads in fuller's earth ($19,426) and petroleum ($1,955,585). Los Angeles in asphalt ($171,904) and brick clay ($335,670). Monterey in glass sand ($12,225). Nevada county leads in gold ($2,142,740). Placer in granite ($105,377). Riverside in pottery clay ($38,920). San Benito in quicksilver ($306,081). San Bernardino leads in borax ($2,043,600), cement ($272,600), limestone ($51,578), marble ($15,600) and turquoise ($11,600). San Diego leads in lithia mica ($31,880) and tourmaline ($150.000). San Joaquin in natural gas ($67,868). San Mateo in rubble ($300,000). Santa Barbara in infusorial earth ($2,172). Santa Cruz in bituminous rock $41,084) and lime ($161,302). Shasta county leads in copper, ($2,496,731), chrome ($4,725) and silver ($616,412). Siskiyou in mineral waters ($187,500). Sonoma in graphite ($1,680) and paving blocks ($82,227). Trinity in platinum ($468). Tulare in chrysoprase ($500) and magnesite ($19,250). Ventura in mica ($2,500).

LARGE COAL CARS IN FRANCE.—The Carmaux Coal Company has ordered 50 coal cars, having a capacity of 50 metric tons each, from the Douai forges. These cars are entirely of steel, and are of the Fox-Arbel type. They are the largest ever built in France.

COAL IN SPITZBERGEN.—Some time ago the Norwegian Government sent an expedition to Spitzbergen to inquire into the value of the coal deposits of that island. The expedition has now returned, bringing numerous samples of the coal, and the commission is of the opinion that the mines will repay working. It is proposed to begin operations next summer.

COAL IN RUSSIA.—The latest official report gives the production of coal in Russia in 1902 at 946,546,000 poods, a pood being about 36 lb. This shows a decrease of 46,703,000 poods from 1901. The imports of coal for 1902 amounted to 210,345,000 poods, and the exports to 3,064,000 poods. This leaves a balance for consumption amounting to 1,153,827,000 poods, being a decrease of 73,156,000 poods from the previous year.

FRENCH IRON AND STEEL TRADE.—Preliminary statistics recently published, for the first half of the current year, show that the output of pig iron in France for that period was 1,365,421 metric tons, of which 270,301 tons were for foundry iron and the balance forge and steel pig. The total shows an increase of 206,673 tons over the first half of 1902. The production of wrought iron in all forms this year was 318,745 tons, an increase of 2,147 tons over last year. In steel, the output of bessemer and open-hearth ingots was 942,658 tons, an increase of 139,484 tons over 1901. The output of steel in finished forms, however, was much less than that of ingots, being 666,571 tons for the first half of 1903, an increase of 48,736 tons over last year.

ABSTRACTS OF OFFICAL REPORTS.

Consolidated Mercur Gold Mines Company, Utah.

The report of this company covers the year ending June 30, 1903. The statement of earnings and expenses for the year is as follows:

	Total.	Per ton.
Gold produced	$1,321,010	$3.81
Miscellaneous	9,277	0.03
Total receipts	$1,330,287	$3.84
Mining	$450,298	$1.30
Milling	572,619	1.65
Total expenses	$1,022,917	$2.95
Net earnings	$307,370	$0.89

Adding to the net earnings shown, the balance of $150,395 from previous year makes a total of $457,765. Payments were $4,522 for construction and $330,000 for dividends, a total of $334,522, leaving a balance of $123,243 forward to current year.

The manager's report says: "The total number of tons of ore milled during the year was 346,359, and the expenses are properly computed on this tonnage. In August, 1902, however, for the purpose of straightening out the records and correcting the then existing practice, the date of the monthly clean-up was changed from the 13th of the month to the 1st, with the result that the bullion shipment credited to the month of July consisted of the product of only the last 18 days of that month. All subsequent months have been credited with their exact proportions. Deducting the 11,196 tons milled during the first 13 days of July leaves the tonnage which actually produced the bullion shown in this report, 335,163.

"The financial statement shows that $1,285,557 in bullion was produced at the Golden Gate mill. This was the product of 335,163 tons of ore, as above explained. Hence the extraction was $3.84 per ton. The tailings for the year averaged $1.21. The average value of the ore, therefore, was $5.05.

"The dividends paid during the year were 11 in number, making a total of $330,000 for the year, being 33c. per share. The previous disbursements of the company were $700,000, hence the total dividends to date are $1,030,000. Adding to the above the amounts paid by the old Mercur Gold Mining & Milling Company and De La Mar's Mercur Mines Company, prior to their consolidation, we find that the grand total of the dividends paid by the properties of the Consolidated Mercur Gold Mines Company is $3,210,313.

"The total operating costs, for mining and milling 346,359 tons of ore, were $997,347, or $2.88 per ton. This includes all of the company's expenses, except the Manning Mill costs, which will be mentioned under another head. The expense of mining was $1.30, and of milling, $1.58 per ton.

"The Manning mill was operated on old Mercur tailings until about the middle of November, last year, and produced $35,453, at a cost of $27,064. The tonnage treated was 55,009, hence the extraction was 64c. per ton, and the expenses 49c. per ton. Operations were suspended at the approach of the winter season, and they have not been resumed this year, pending the completion of the Moore slimes process at the Golden Gate mill.

"Reference to the company's previous annual reports shows that the tailings for 1901 averaged 95c., and for 1902, $1.19. For six months preceding May 1 of the present year they averaged $1.30. The board of directors then authorized the installation of the Moore slimes process, which had been carefully tested at our works, and had given uniformly satisfactory results, showing a flattering improvement upon the extraction obtained by the straight leaching method. Construction work was promptly inaugurated, and is now well under way. However, it has proven to be a bigger piece of work than was first thought, and it is liable to take another 60 days before the machinery can be put into commission. Since the first of May we have been running on a reduced tonnage, and have exercised more care in mining, with a view toward keeping out as much as possible the more slimy ores. The result is that the tailings for May and June were so low that the average for the year was brought down to $1.21."

An estimate of ore in sight, made at the beginning of April, gave a total of 955,655 tons. This does not include what the engineer calls "mining possibilities."

The president's report says: "It will be observed that a gratifying improvement has been made in the operating expenses, which averaged $2.88 per ton for the year, against the previous year's record of $3.50. Stockholders were advised by circular letter, on May 9, that the directors had decided to install the Moore slimes process, for the purpose of bettering our extraction. For six months prior to May 1, the tailings had averaged $1.30, and the numerous experiments which we had made with the Moore process demonstrated that by using this method a much closer saving of the values in our ores could be effected. Construction work was promptly begun, but it soon became apparent that the time required to install the equipment would be a good deal longer than the original estimate. At this writing the plant is not nearly completed. As a number of our leaching vats are being converted into filtering tanks for the new process, it has been necessary to curtail the output of the mines during the progress of the construction work. If the Moore process proves to be all that we expect, we purpose installing it at Manning, as well, for the purpose of re-treating the old Mercur tailings."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL

Gold Deposits of New Zealand. By Alexander McKay, Government Geologist. Wellington, N. Z.; Government Printer. Pages, 76.

New South Wales Chamber of Mines. Sixth Annual Report, 1903. Sydney, N. S. W.; published for the Chamber of Mines. Pages, 12.

The South Wales Coal Annual, 1903. Edited by Joseph Davies. Cardiff, Wales; Joseph Davies. Pages, 236. Price (in New York), $1.75.

United States Geological Survey. Production of Nickel and Cobalt in 1902. By Joseph Hyde Pratt. Washington; Government Printing Office. Pages, 12.

Modern Practical Electricity. By R. Mullineux Walmsley, Chicago, Ill., W. T. Keener & Co. In three volumes. Pp. 888; illustrated. Price, per volume, $3.

Report of the Chief Inspector of Mines in India. 1902. George A. Stonier, Chief Inspector. Calcutta, India; Government Printing Office. Pages, 40; with maps and illustrations.

The Mechanical Engineers' Pocket Book. By D. Kinnear Clark. *Fifth Edition,* Revised and Enlarged by H. H. P. Powles. New York: The D. Van Nostrand Company. Pages, 692. Price, $3.

United States Geological Survey. Oil-Fields of the Texas-Louisiana Gulf Coastal Plain. By C. W. Hayes and William Kennedy. Washington; Government Printing Office. Pages, 176; illustrated.

Dominion of Canada. Thirty-Fifth Annual Report of the Department of Marine and Fisheries. Hon. Joseph Raymond F. Prefontaine, Minister. Ottawa, Canada; Government Printer. Pages, 148; illustrated.

The disease caused by the inhaling of minute particles of angular quartz in the Rand mines is now termed 'Silicosis;' this distinguishes it from other forms of miner's phthisis.

BOOKS REVIEWED.

United States Geological Survey. Gaines Folio, Washington, 1903; Government Printing Office. Pages, 22; illustrated. Price, 25c.

This folio, No. 92, of the series issued by the United States Geological Survey, describes the Gaines quadrangle in Northern Pennsylvania, an area about 17 miles long from north to south, and 13 miles wide, that lies immediately south of the New York-Pennsylvania boundary, and about midway between the eastern and western limits of the State. It adjoins the Elkland-Tioga quadrangle, described in another folio. The area is part of the Allegheny plateau, the flat tops of the mountainous belts of the quadrangle having elevations of from 2,200 to 2,610 ft. It is drained by the Cowanesque river, a part of the drainage system of the northern branch of the Susquehanna, and by Pine creek, part of the system of the western branch of the Susquehanna. The geologic formations include those of Devonian, Devonian-Carboniferous, Carboniferous and Pleistocene age. The Devonian formation represented is the Chemung, comprising impure limestones, calcareous sandstones, and typical sandstones. The Devonian-Carboniferous formations are the Cattaraugus and Oswayo, mostly shales and sandstones, which belong to the Catskill-Pocono group. The Carboniferous formations are the Mauch Chunk shale and the Pottsville sandstone and conglomerate. There are few deposits of economic importance, and interest in the mineral possibilities is largely confined to the possibility of finding oil, the Gaines oil field being on the quadrangle's southern edge. No oil in paying quantities has been found within the quadrangle. The only coal found is near Gurnee. The basin is not large, and the mines are worked now in a small way, being about exhausted.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Some Questions on Smelting.

Sir.—In your Questions and Answers department, under date of June 27, 1903, some valuable advice was given regarding the use of wood in reverberatory matting furnaces. Prof. Hofman's extremely valuable contribution to the Albany meeting of the Institute leads me to the following questions which I cannot find answered in any literature now available to me.

1. What is the probable maximum size of hearth available with a mixture of oak and pine wood? What size should the fire-box have, how much wood should it burn and how much cold raw concentrates and picked ore should it smelt? The largest wood burner I know of is 22 by 12 ft. hearth, and burns 20 cords of wood.

2. I had planned to use a roaster following the smelter, but I learn from Prof. Hofman that this has been tried without success. I have understood that roasters are used in Russia following oil-burning reverberatory smelters. Even with the irregular heat from the smelter, would not a partial roast be obtained? Would a higher stack and better draft help? What was the exact trouble and results?

3. If gas is used, what would be the probable saving in wood? Could the gas he fired direct or must it pass regenerative chambers? A diagrammatic sketch of this system as used in Butte would be highly interesting to those not familiar with this class of furnaces.

If any of your readers would answer these questions, the information would be valuable to many in this region.

W. A.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

IMPORTED COAL—STORES OF AMERICAN VESSEL.—Where the cargo of an American steamer consisted of coal, which was also the property of the owners of the vessel, who, before the arrival of the vessel in port, set aside a portion of the coal as the coal stores of the steamer, and such coal was not unloaded; *held* that such coal was free of duty as the coal stores of an American vessel under paragraph 523, Tariff Act of 1897, notwithstanding the fact that the importers made an entry of the entire lot of coal at the custom house.—Appeal of Pacific Coast Company from Collector of Customs at Sitka, Alaska; Board of General Appraisers.

DUTY ON SULPHIDE OF ANTIMONY.—In this case the merchandise imported was invoiced as antimony ore. It was assessed for duty as an unenumerated manufactured article at 20 per cent ad valorem under section 6 of the Tariff Act, and was claimed to be free of duty under paragraph 476 as "antimony ore, crude sulphide of."

The board found from the testimony and sample that the article in question was sulphide of antimony that had been crushed or broken. The protest was sustained and the Collector's decision reversed, the ore being admitted free.—Appeal of Knauth, Nachod & Kuhne from Collector of Customs at New York; Board of General Appraisers.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Mica.—Will you kindly favor me with data as regards the market price and supply and demand for mica?—H. S. P.

Answer.—Inquiries of similar import have been answered repeatedly in this column, and on March 28, 1903, there was published in the JOURNAL a full description of the mica industry. We refer all correspondents interested in mica to that article, and would add that the principal consumers are the General Electric Company, Schenectady, N. Y., and Eugene Munsell & Co., 218 Water street, New York City.

Iron Deposits of Missouri.—I have read several times that there are immense deposits of magnetite and hematite in Southern Missouri. In fact, that there were mountains of almost solid mineral. If this is so, why are they not more worked? Is the ore especially refractory?—I. S. R.

Answer.—Your information is—or rather was—correct. The famous deposits of Iron Mountain and Pilot Knob, in Missouri, were among the most remarkable in this country. The ore was of high grade, and formed the basis of an important industry, supplying a number of blast furnaces at St. Louis, Carondelet and other points. These deposits, however, proved to be large lenses, and did not extend to any considerable depth. They were entirely worked out years ago.

Feldspar.—What market is there for this mineral, how is it shipped and what is its value?—McR.

Answer.—The feldspar industry is supported principally by the china and porcelain factories which use the mineral as a flux and for glazing purposes. Other uses are for making glass, soap and polishing materials, and a small quantity is also employed in dentistry. To prepare feldspar for market it is customary to first remove the coarser impurities with a hammer. Shipped in the lump state, feldspar sells at $3@$6 per short ton at mine, while a satisfactory grade of ground mineral brings $8@$9 per short ton, f. o. b. New York. Pottery manufacturers demand a product that is free from iron oxide, mica and quartz. For full particulars as regards the occurrence, mining and marketing of feldspar, see *The Mineral Industry*, Vol. VII.

Bag-filtering Systems.—How are bag houses installed in connection with smelting furnaces? What are the limitations to their use? Who was the originator of the idea?—V. D.

Answer.—Bag houses are arrangements for the filtration of solid matter from gases. The fume from many smelting furnaces consists of metal (lead or zinc, for example) which has been reduced, volatilized and reoxidized, the fine particles of the resulting oxide floating in the gaseous current and being extremely difficult to separate by any system of gravity-settling, or even by scrubbing the gas. The alternative is to pass the gas through a porous medium, like woolen or cotton cloth, which will catch the floating fume. In this way a very complete filtration can be effected. The idea was originally put into practice by Samuel T. Jones, in 1850, at one of the zinc works in New Jersey, and it was developed to a high degree of perfection in the manufacture of zinc white before it was applied to other branches of metallurgy. In connection with the latter a good deal of mystery has been thrown around the process, which, however, is essentially the same as practised by the makers of zinc white and incapable of any broad protection by letters patent.

In almost all modifications of the system the filtering medium is arranged in the form of tubes of cloth, commonly called bags, about 18 in. in diameter and 30 ft. in length, suspended vertically in groups, and to the number requisite to afford the necessary filtering surface. The gas and fume from the furnaces are passed into the bags, which, being closed at one end, compel the gas to find egress through the cloth, while the fume is retained on the inside, falling either to the bottom or adhering to the sides, whence it is dislodged by periodical shakings. The gas may be introduced either through overhead mains, from the nipples of which the bags are suspended (as is the common practice in the zinc works); or the gas may be introduced at the lower ends of the bags, the closed, upper ends being supported from the roof of the building (as is the common practice among lead smelters).

The requisites for successful bag-filtration are cooling of the gas safety below the ignition temperature of the bags and absence of any corrosive substance in the gas which would destroy the bags. The bags must be arranged in groups, which can be cut off from each other, so as to afford access to them, and there must be sufficient area of cloth. It is advisable to design the bag house so that additional sections can be added easily if required. The cooling of the gas is effected by passing it through iron pipes of sufficient surface to enable the surplus heat to be radiated and the movement of the gas is effected by fan blowers of suitable size.

The gaseous products from zinc-white furnaces, lead-smelting blast furnaces and the reverberatory furnaces used for softening and refining pig lead are successfully filtered through bags. The gaseous products from ore-roasting furnaces cannot be successfully filtered because of the inevitable presence of sulphuric trioxide, which quickly destroys the bags. The gas from Scotch hearths can be filtered, however, because it is by the nature of the process free from sulphur trioxide, and sulphur dioxide alone is harmless. Besides the filtration of fume, bags have been used successfully for the recovery of the dust arising in fine-crushing gold and silver mills, for which purpose the installation is naturally a good deal more simple than for the handling of the hot gas from a furnace.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

Week Ending October 6, 1903.

740,404. LADLE FOR CARRYING AND TIPPING BLAST-FURNACE SLAG.—John H. Dewhurst, Sheffield, England. In combination with a slag pot or ladle, a band secured around the same in close proximity to the rim, and attaching links or lugs carried by said band for attaching the operating-chain.

740,405. CARRIAGE FOR LADLES USED FOR CARRYING AND TIPPING BLAST-FURNACE SLAG.—John H. Dewhurst, Sheffield, England. In combination, in a carriage for ladles having double or twin trunnions, a pedestal-bearing for said twin trunnious comprising a hollow bearing-bracket, one for each side of the ladle, three rotary disks arranged in each bracket with their spindles resting in bearings in each side of the hollow bracket, the center roller being made of less diameter than the two outer rollers.

740,418. FEEDING MECHANISM FOR ROLLING-MILLS.—Jerome R. George, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass. The combination with a pair of rolls having two sets of circumferential grooves forming passes for a billet, and a billet-supporting table in front of said rolls, of a vertically-movable plate normally held in the plane of the supporting-table, raised flanges on said movable plate between which a billet is conducted to one of the passes in said rolls, and a vertically-movable guide-plate by which the advancing end of a billet is deflected upon said movable plate.

740,442. APPARATUS FOR MANUFACTURING SEAMLESS TUBING.—John H. King and Edward M. Wolfe, Beaverfalls, Pa., assignors of one-third to George H. Blaxter, Pittsburg, Pa. The combination with the table of a tube-mill having longitudinal ways or grooves on its inner sides, and a mandrel movably carried on the table; of a centering device for the mandrel consisting of a vertical frame adjustably mounted upon said table, and having lugs or projections for engaging said ways whereby the same may be adjusted lengthwise of said table.

740,455. BLOWPIPE-REST.—William H. Moon, Muncie, Ind. A blowpipe-rest comprising a bracket having a downwardly-projecting stem, two pairs of upwardly-extending arms, each pair of arms carrying a non-revoluble axle, a roller mounted on each, collars on each side of the rollers, and antifriction-balls between the collars and their respective roller.

740,472. APPARATUS FOR CONTROLLING TEMPERATURE OF SUBSTANCES TO BE HEATED.—Charles F. Ruby, St. Louis, Mo., assignor to Missouri Locovolo Company, St. Louis, Mo. Means for controlling the temperature of substances being heated by a liquid-fuel burner comprising the combination, of a fuel-burner, a vaporizing-chamber, a source of fuel-supply leading into the vaporizing-chamber, having a contracted discharge-opening, means for applying heat to the fuel at or near its point of discharge into the burner, and means for heating the vaporizing-chamber from the substance being heated.

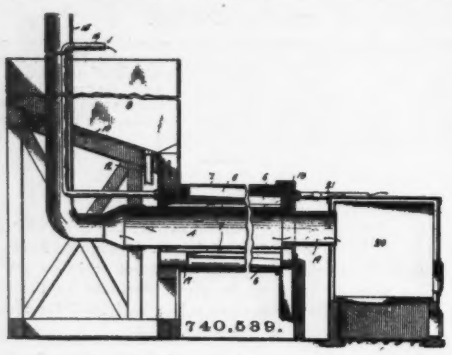
740,496. AIR CONDUIT FOR HYDRAULIC AIR-COMPRESSORS.—William O. Webber, Boston, Mass.—In a hydraulic air-compressing apparatus, the combination with a water-passage of submerged air-chambers, air inlet pipes connected to said chambers and horizontally-disposed adjustable air-conduits leading from the chambers, and spanning the water-passage.

740,497. WELL-DRIVING HAMMER.—Troy D. Westbrook, Pensacola, Fla. The combination with a pair of engines having parallel piston-rods, of a piston-hammer driven thereby and having a hole therethrough between the piston rods.

740,528. FURNACE.—Henry B. Cary, Los Angeles, Cal., assignor to Frederick W. Braun, Los Angeles, Cal. In a furnace such as described, a plurality of gas-mixing combustion-chambers, each successive chamber connected with its predecessor by a contracted channel the initial end of which is in advance of and at an acute angle with the terminal portion of the wall of the chamber, and each chamber gradually increasing in area from the outlet-passage of its predecessor and then gradually decreasing in area toward its own outlet-passage to the succeeding chamber; whereby the gaseous products contained in each chamber and moving successively in the general path of the draft of the furnace, are caused to reverberate against the draft-current to release encysted constituents and mix the same in due proportions to be ignited by the heat generated by previous ignitions or explosions.

740,539. FURNACE FOR CALCINING QUICKSILVER ORES.—John M. Cutler, Ukiah, Cal. In a furnace for cal-

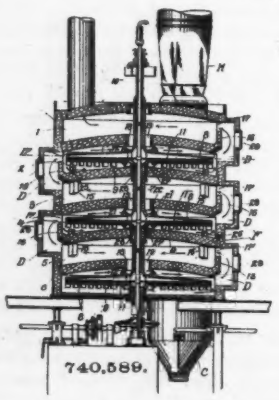
cining ores, an outer hollow cylinder having on its inner surface a plurality of spirally-arranged flanges extending throughout the length of said cylinder, an inner hollow



cylinder supported concentrically within said outer cylinder, a plurality of longitudinally-extending flanges on the outer surface of said inner cylinder and means for imparting rotation to said outer cylinder.

740,557. SHOVEL-NOSE.—William E. Hamilton, Zanesville, Ohio. The combination with a conveyor having laterally-movable flights of a shovel-nose adapted to be forced into the material to be gathered.

740,589. ROASTING-FURNACE.—Charles H. Repath and Frank E. Marcy, Anaconda, Mont. In a furnace having a plurality of vertically-disposed hearths, peripheral chambers establishing communication between the several hearths, a central vertical stirring shaft in said hearths, a series of stirring arms radiating from said shaft and extending into



the several hearths, spouts or chutes leading from and extending a suitable distance beyond the margins of an alternate series of hearths to the series immediately beneath for permitting the descent of the material, yet excluding the gases, and special rakes carried by the stirring-arms for removing the material delivered through the spouts.

740,590. METHOD OF DAM CONSTRUCTION.—Mark D. Rochford, Los Angeles, Cal. A method of dam construction consisting in forcing a casing into the bed of a stream, forcing another casing into the bed alongside the first casing, removing the sand or earth from within the casings, placing impervious material within the casings, and pulling up the casings.

740,678. AMMONIA-STILL.—Edwin A. Moore, Philadelphia, Pa. A receptacle composed of semi-cylindrical and detachable sections connected by flanges, and horizontal partitions having openings therein, whereby communicating chambers are formed between the partitions, means for supporting said partitions, and means for supplying a liquid and a fluid to said receptacle.

740,701. TREATMENT OF SULPHIDE ORES.—Amèdée M. G. Sébillot, Paris, France. A process for treating ores containing sulphur consisting of sulphating the ore in a closed vessel by the action of sulphuric acid upon the metallic sulphides at a temperature above its boiling-point and simultaneously recovering the sulphuric acid used, calcining the sulphated ore at a temperature of 700° C. to dissociate the sulphate of iron to prevent dissolving of a too great quantity of sulphate of iron in the lixiviating liquors, and then lixiviating the calcined ore.

740,720. COAL OR ROCK DRILL.—Isaac Wantling, Peoria, Ill., assignor to Wantling's Favorite Coal Drill Company, Peoria, Ill A drilling-machine, comprising suitable uprights, a boxing of two hinged sections together forming a feed-nut, a support for said boxing vertically adjustable on the uprights having upwardly and downwardly disposed sustaining-points, and means for supporting the boxing between the sustaining-points of the support.

740,725. BANK OR MINE CAR.—Gorham D. Williams and Andrew J. Coney, Charleston, W. Va. A bank or mine car having a floor end provided with a projecting curved central portion, and with a coupling-pin opening through the floor at the rear of said curved portion; a draw-bar extending substantially from end to end of the car and having a perforation matching the opening in the floor; a link; and a pin securing the link to the end of the draw-bar, the link extending beyond the floor end of the car.

740,731. APPARATUS FOR MINING PHOSPHATES.—John Beatey, Bone Hill, Fla. An apparatus for mining phosphatic pebble, comprising a station having washing and cleaning apparatus for the material and a pump and motor

therefor for elevating the material thereto, a pipe extending from said pump to the sump, and an auxiliary pump having an independent motor, said auxiliary pump being coupled with said pipe and intermediate the first-named pump and the sump end of the pipe and arranged in a plane considerably below that of the first-mentioned pump and at or near the level of material in the sump for drawing said material from the sump and forcing it to the first-mentioned pump in the upper plane, the pipe connection between the two pumps being directly to the inlet of the upper one from the outlet or discharge of the lower one, whereby there is no opportunity for settling of material between the two pumps, means being provided for furnishing power from the station for operating the lower pump.

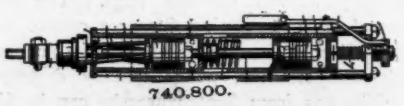
740,762. ACID-VALVE.—John Koch, West Berkeley, Cal. An acid-valve consisting of a main body having an inlet and an outlet pipe, a cup-shaped member slidable in said body and adapted to open or close one of said pipes, a stem attached to and adapted to operate said member, a secondary cup-shaped member above said other member and encircling said stem and secured to said body, and a seat above said member to prevent escape of acid during its flow through the valve, and a yoke above said secondary member adapted to hold said seat in place, the parts of said valve subject to comparatively excessive wear and strain being formed of a rigid metal, while the retaining portions, in contact with the acid, are formed of lead.

740,764. PULVERIZING APPARATUS.—William A. Köneman, Chicago, Ill., assignor of one-half to Azel F. Hatch, Chicago, Ill. In a pulverizing apparatus, the combination with the stationary base and rotary crushing-bed, of a series of radially-disposed stationary standards on the base about said crushing-bed, said standards being secured together to form a rigid frame on the base, roller-supports in the said radially-disposed standards, raising and lowering means for the said supports in said standards, a series of horizontally disposed crushing-rollers above the crushing-bed having outward-projecting shafts, and journal-boxes for said shafts pivotally mounted in said supports to swing in the vertical plane in the standards.

740,771. GAS-COMPRESSING MACHINE.—Thomas McIntyre, Adelaide, South Australia, Australia. In a gas-compressor, the cylinder, provided with suitable heads, one tight and the other containing a gland, in combination with the piston having a piston-rod extending through said gland, the inlet-valves of said cylinder, a high pressure discharge valve distant from the gland end of the cylinder, the low-pressure discharge-valve at the gland end of the cylinder, a by-pass leading therefrom and discharging into the opposite end of the cylinder and said piston normally and when in movement, preventing the discharge of gas from said by-pass into said opposite end of the cylinder at all times, except during the last part of the minor pressure-stroke of the piston and during the first part of the major pressure-stroke thereof.

740,786. REVERBERATORY HEATING-FURNACE.—Stephen Uren, Sacramento, Cal. The combination in a furnace of an inclosed heating-chamber having vertical sides and ends, a discharge-passage leading from one end at the floor-level and inclining downwardly therefrom, said floor being also inclined from the opposite end towerd the discharge-flue, a burner inlet-passage located in the end wall in line above the discharge-flue and near the top of the chamber, said burner being directed to discharge hydrocarbon fuel against the opposite end of the chamber from which it is deflected and returned along the floor to the discharge-flue.

740,800. ROCK-DRILL.—William Brady, San Francisco, Cal. The combination in an apparatus for striking blows

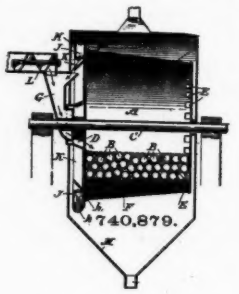


of cylinders fixed axially in line and having an intermediate space, pistons movable in the cylinders, a piston-rod common to both pistons and extending through the end of one of the cylinders, a tool-carrying head fixed to the piston-rod, inlet and exhaust valves connected with the rear ends of each cylinder, means for advancing the apparatus to follow the work, and a cushion-spring 19 surrounding the piston-rod and located between the two cylinders, said spring having one end abutting against the rear of one cylinder and having the opposite end lying within the open end of the other cylinder, and a collar or disk on the rod in front of the piston of the last-named cylinder adapted to strike the spring, said spring serving to check the momentum of the parts.

740,832. PROCESS OF MAKING PEROXIDE OF ZINC.—Friedrich Elias, Philadelphia, Pa., assignor to the Biogen Company, New York, N. Y. A process of making peroxide of zinc, consisting in subjecting the hydrate of barium peroxide to the action of a salt of zinc the radical of which forms a soluble salt with barium.

740,872. MINER'S SAFETY-CAGE.—Frederick C. Kerst Springfield, Ill.; Julia Kerst administratrix of said Frederick C. Kerst, deceased. In a safety-cage, the combination of a main frame, a vertically-slidable lifting rod, transverse plates secured to the main frame, collared bolts passing through said plates, levers turning on the collars of said bolts and provided with hubs, dogs surrounding the hubs of said levers and turning on said bolts, springs acting against said dogs, a connecting device connected with said lifting-rod, intermediate levers connecting said first-named levers with said connecting-device, and springs operating said intermediate levers.

740,879. BALL GRINDING-MILL.—Povl T. Linhard, New York., assignor to Alexander Foss and Poul Larsen, Copenhagen, Denmark. In a ball grinding-mill, a rotable drum



provided with a substantially central inlet-opening and with a plurality of peripheral discharge-openings, grinding-balls in said drum below the axis thereof, a hopper communicating with said central inlet and means to feed the fresh material to said hopper whereby the fresh material is delivered directly to the grinding-balls within the drum, a screen to receive the material discharged from the drum through the peripheral openings, and means carried by the drum to lift the material rejected by the screen and discharge the same into the top of the hopper to be delivered through the same into the drum with the fresh material.

740,884. DROP-STAMP.—Bernhard Löhr, Frankfort-on-the-Main, Germany. A drop-stamp comprising individual stamps having shoulders at their upper ends, and a top plate loosely connected to the stamps and made to uniformly lift the latter by their upper shoulders while allowing unequal movement or drop of such stamps.

740,887. APPARATUS FOR WASHING SAND, GRAVEL, AURIFEROUS ALLUVIA, OR THE LIKE.—Paul Maurice St. Etienne, France, assignor of one-half to La Société Nouvelles des Etablissements de L'Horme et de La Buire, Lyons, France. In a device of the character named, the combination of a rotative vessel inclined inward at its upper part with an agitator comprising a curved rod stretched by a spring affixed to a funnel depending within said vessel, and means for emptying said vessel.

740,902. HOLDER FOR CUTTING PRECIOUS STONES.—Henry W. Oostendorp, Cincinnati, Ohio. A device for holding precious stones composed of a holder, a swiveling stem journaling therein, composed of two sections, one swiveled upon the other having a horizontal axis and clamping devices, a stock mounted upon the lower stem-section carrying a stone-holder journaled upon an axis having bearings in said stock, an index setting-disk mounted upon the said tool-holder and locking devices for holding said disk in its adjusted position.

740,906. ROCK-DRILL ATTACHMENT.—David A. Owen, Putney, Vt. The combination of a rock-drill having a primary cutter, of an auxiliary cutter rotatably adjustable

with reference to the primary cutter, and mounted on the shank of the drill above said primary cutter and adapted to move up and down therewith.

740,994. COMPOSITION OF MATTER.—Benjamin F. Schwier, Cleveland, Ohio, assignor of one-half to Herbert J. Norris, Wellington, Ohio. A composition of matter consisting of shale, grit-sand, fire-clay and jollie-clay.

740,999. AIR LIFT-PUMP.—John P. Couse, Glendale, Cal. In an air lift-pump the combination of a delivery-pipe; an extra supply-chamber having a tapering top attached to the lower end of said delivery-pipe; an annular fitting in the lower end of said supply-chamber, said fitting having vertical ports extending therethrough and upwardly-extending partitions intermediate said ports; ball valve-stoppers between said partitions; a pumping-chamber extending through said fitting provided with an upwardly-opening check-valve in the bottom thereof.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep THE JOURNAL informed of their movements and appointments.

Mr. Auguste Mathez has returned to Denver.

Mr. Stephen Humphreys is at the city of Mexico.

Prof. John H. Furman, of Chihuahua, is in New York.

Mr. P. B. Waugh has returned to London from West Africa.

Mr. Albert F. J. Bordeaux is in charge of mines in Siberia.

Mr. J. D. McGillivray has left New York on his return to Alaska.

Mr. J. Morrison Burnup, of London, is at the Waldorf, New York.

Mr. Waldemar Lindgren is examining deep leads in Victoria, Australia.

Mr. F. L. Bosqui has returned to Grass Valley, Cal., from San Francisco.

Mr. Edward G. Stoiber has reached London from Shanghai via Siberia.

Mr. Edward Mills, of Williams, Foster & Co., Swansea, Wales, is in New York.

Mr. Frank Smaile is now superintendent of the Portland mine, Victor, Colo.

Mr. J. E. Stevenson, of Gabalana, Chihuahua, Mex., is visiting California and Utah.

Mr. Hal. W. Hardinge returned from London by the *Minnetonka*, on October 12.

Mr. Richard Pearce arrived by the *Cedric* and left New York for Denver on October 14.

Dr. F. L. Slocum, of Pittsburg, was in New York last week. He is now at Denver.

Mr. Chester W. Purington and Mr. Fred Farish have left Denver for Sonora, Mexico.

Prof. Heinrich Ries, of Cornell University, is preparing a report on the clays of Texas.

Mr. Harold Rickard has left Chihuahua, Mexico, on a prospecting expedition into the interior.

Mr. B. N. Norton, of Bisbee, Ariz., has been examining mining properties near Cananea, Mex.

Mr. Henry Gardner, of the London metal firm of Henry R. Merton & Co., arrived by the *Cedric*.

Capt. J. Murdoch Wiley has been very ill, but is now, we are glad to state, on the road to recovery.

Mr. J. C. Gladden has resigned as manager of the Tonopah-Belcher Mining Company, Tonopah, Nev.

Mr. Thos. C. Taylor, of Bridgeport, Conn., president of the Stevens Copper Company, is at Clifton, Ariz.

Mr. W. A. Fremersdorf has opened an office as metallurgist and mining engineer at Vancouver, B. C.

Mr. George Z. Edwards has resigned as superintendent of the Consolidated Mercur mines, Mercur, Utah.

Mr. Harry Waller arrived at New York from Tasmania by the *Aurania* on October 9. He left for Denver the same day.

Mr. Frank Popplewell, of Owens College, Manchester, is visiting the iron and steel works of this country.

Mr. J. L. Parker has been manager of the North Star mine, near Cranbrook, B. C., until it shut down recently.

Mr. C. C. Titus is in charge of the Wallace, Idaho, sampling works of the American Smelting and Refining Company.

Mr. C. E. Bruff, of the Bradley Engineering and Machinery Company, is back at Spokane from a trip to central Idaho.

Mr. Reginald Cooper, has resigned as superintendent at the Bluestone plant of the Arizona Copper Company at Clifton, Ariz.

Mr. C. W. Milne, of London, is at Ocampo, Chihuahua, Mex., in the interests of the San Ramon Mining Company.

Mr. A. M. Wagner, of Webb City, Mo., president of the Thames Mining Company, has gone to Hermosillo, Sonora, Mex.

Mr. T. Jay Hurley, manager of the Mine Securities Corporation properties, at Silverton, Col., has been at Prescott, Ariz.

Mr. L. A. Dunham, manager of the Clifton Consolidated Copper Company, at Clifton, Ariz., has returned from a trip to New York.

Mr. Frederick Correll, who has been visiting our western mining regions, has returned to Cologne, sailing by the *Deutschland* on October 14.

Mr. H. C. Hoover, of Bewick, Moreing & Co., is now in Victoria, Australia inspecting the mines of the London & Globe Deep Lead Assets, Ltd.

Prof. Robt. H. Richards, of Boston, was in New York on October 15, and attended the sessions of the American Institute of Mining Engineers.

Mr. Thomas G. Jones, of G. W. Lehmann & Son, of Baltimore, Md., has gone to Randolph county, Ala., to examine the old Pinetucky mine.

Mr. Martin J. Heller, general manager for Capt. J. R. DeLamar, is at San Francisco, Cal., having returned from an extended tour in Mexico.

Mr. D. McVichie, of the Bingham Consolidated Company, has been at the Balaklava copper mines in Shasta county, Cal., from Salt Lake City, Utah.

Mr. Herbert J. Daly, from Melbourne, representative of the Consolidated Mines Selection Company, of London, sails by the *Campania* on October 17.

Mr. R. Hamilton, president of the Western Australian Chamber of Mines, and manager of the Great Boulder Proprietary Gold Mines, is in California.

Mr. F. E. Milsted, formerly of Culiacan, Sinaloa, Mex., has been appointed general manager of the Ures Consolidated Mining and Milling Company, at Abalan, Mex.

Mr. Jas. Piper, recently with the United States Steel Corporation, has accepted the position of manager of the Mitchell Development Company of Bisbee, Ariz.

Mr. William H. Kritzer has resigned from the Risdon Iron Works, and will resume his old position with the Joshua Hendy Machine Works, of San Francisco, Cal.

Mr. G. A. Warth, of Cripple Creek, Colo., has been appointed general manager of the properties owned by the Stratton Cripple Creek Mining and Development Company.

Mr. Paul Neilson, of Manitowoc, Wis., will have charge of the properties of the Gold Standard Mining Company in the Chemehuevis mountains, near Kingman, Ariz.

Mr. J. F. Parr has resigned as superintendent of the Esmeralda Consolidated Mining Company, near Hawthorne, Nev., and will be succeeded by Mr. H. W. Nelson, of Sumpter, Ore.

Mr. M. B. James is general manager of the Mediqueno mine, in the district of Sabinas, and the Eureka, in the Enmedio mountain in the district of Via Mena, State of Hidalgo, Mex.

Sir Charles Metcalfe, a director of the British South Africa Company and the Consolidated Gold Fields of South Africa, is visiting the mining and industrial centers of this country.

Mr. William Gilliland, assistant master mechanic of the Cleveland-Cliffs Company, Ishpeming, Mich., has accepted the position of master mechanic at the Quincy mine, Hancock, Mich.

Dr. C. H. Gordon, recently instructor in geography and geology at the University of Nebraska, has charge of the department of geology at the University of Washington during the absence of Prof. Henry Landis.

Mr. R. P. Jarvis, late superintendent of the Silver City, Gold and Silver Mining Company, near Silver City, N. M., has accepted the position of professor of mining at the Washington Agricultural College at Pullman, Wash.

Mr. Herbert Haas, of San Francisco, has accepted the position of smelter superintendent for the Great Western Gold Company at Redding, Cal., where he will have charge of the erection of a 175-ton smelter with sampling works.

Mr. Thomas J. Hurley, president of the Mine Securities Corporation, and Mr. George J. Schermerhorn, its treasurer, are visiting mines operated by the corporation in the San Juan district, Colorado, and from there will probably go to Guanajuato, Mex., before returning to New York.

Mr. Charles A. Francis, of the tool-making department of the Pratt & Whitney Company, has been appointed by the Japanese Government instructor of the Tokio High School of Technology. He is expected to remain in Japan about three years, and was to sail from San Francisco October 15 on the *Nippon Maru*.

Professional men are warned against an adventurer calling himself Dr. Peter von Tunner, Dr. Otto Humboldt, etc. He has imposed upon the charity of several engineers at Sault Ste. Marie, Butte and elsewhere. He usually refers to professional men of prominence and deceives kind-hearted people by a clever tale of hard luck.

OBITUARY.

Frank Stevens, one of the best known mill men in the Northwest, died last week at Buffalo Hump, Idaho, from pneumonia. Mr. Stevens had been erecting the Jumbo mill at Buffalo Hump.

INDUSTRIAL.

The Lackawanna Steel Company is building a large ore roaster at its North Cornwall furnace.

Fairbanks, Morse & Co. are building a 100-ton mill for the Dixie Meadows Company in Quartzburg district, Oregon.

Mr. C. E. Grelle, manager of the Willamette Boiler Works of Portland, Ore., has equipped the plant for heavy work, for mines, smelters, etc.

Julian Kennedy, Sahlin and Company, Limited, of London, Eng., are stated to have large orders in hand for new iron and steel plants from Austria and Italy.

The Salt Lake City branch of the General Electric Company has been awarded the contract for the electric plant to be installed by the Nampa Mining Company, of Nampa, Ida.

The Negociacion Minera de San Salvador is to lay 5,000 ft. of cable tramways at Santa Catarina, Nuevo Leon, Mex., the order for the material having been placed with the Trenton Iron Company, of Trenton, N. J.

An order has been received by the C. Trautman Company, of Pittsburg, Pa., from the Vereeniging estates, of Vereeniging, Transvaal, South Africa, for a number of Cyclone grip drills, spare drills, miners' lamps, etc., to be used in the mines of that district. The manager is W. R. Wilson, formerly of Pittsburg.

The 100-ft. Davis roasting furnace, lately built at the smelter at Grand Encampment, Wyo., by the F. M. Davis Iron Works, of Denver, Colo., is at present treating about 60 tons of concentrates daily, roasting down to from 4 to 5 per cent sulphur, using therefor only 4½ tons of the lignite coal of the neighborhood.

The Baldwin Locomotive Works, of Philadelphia, Pa., expects this year to turn out nearly 2,000 locomotives. Up to October 1 it had shipped 1,469 locomotives, or within 64 of last year's record. Fifteen thousand men are engaged at the plant in Philadelphia and 2,000 at the Burnham works, in Mifflin county, where the Baldwin Company now does much of its heavy work.

The improvements at the McFeely-Wheeler Brick Company, at Latrobe, Pa., will allow an annual output of 12,000,000 brick. The improvements include 12 additional kilns, two additional 56,000-lb. wet pans, a 6-tunnel hot-air dryer, twin crushers, a 150-h. p. Atlas engine, 200-light generator, and two 100-h. p. boilers. The company makes high grade silica brick, and will also make special silica brick for regenerative and puddling furnaces and coke oven crowns. The grannister comes from quarries at Holidaysburg.

The Allis-Chalmers Company, of Chicago, proposes to install an 1,800 h. p. horizontal, two-cylinder gas engine of the Augsburg-Nurnberg type at the power plant exhibit of the St. Louis World's Fair. This engine is the design of the Vereinigte Maschinenfabrik Augsburg and Maschinenbaugesellschaft Nurnberg, of Nurnberg, Germany, and the right to build these engines in the United States was recently acquired by the American firm. The Allis-Chalmers engine will measure 60 ft. over all, with an extreme width to outside of dynamo of 19 ft. The fly-wheel will be 16 ft. in diameter, and when developing 1,800 h. p. this engine will run to 92 revolutions per minute.

The Lackawanna Railroad has awarded contracts for the heating and ventilating systems for its new Keyser Valley car shops to the Buffalo Forge Company. Each of the two freight car repair shops will contain two fans, with 7-ft. blast wheels and heaters of about 8,000-ft. surface. The machine and blacksmith shops will contain a fan with 7½-ft. blast wheel and a 6,000-ft. heater. The painting shop will contain a blast wheel of 9-ft. diameter and a heater of 8,000-ft. surface, supplemented by an exhaust fan having a blast wheel of 9½-ft. diameter. The wood working mill will have a fan with 7½-ft. blast wheel and 6,000-ft. heater. The fans will all be electrically operated.

An order for three steam turbines of the largest size has recently been placed with the Westinghouse

Machine Company, of East Pittsburg, by Westinghouse, Church, Kerr & Co., acting as engineers and constructors for the Pennsylvania Railroad in connection with the New York terminal equipment. These machines will form the initial installation in the new Long Island power house, on which construction is just beginning. The turbines will be of the Westinghouse horizontal short-barreled type, mounted upon a single bedplate, resulting in a particularly compact arrangement and great economy of floor space; they will have a capacity of approximately 7,400 electrical h. p. each, and will drive 5,500-k.w., three-phase, alternating current generators operating in parallel.

Crawford & McCrimmon Company, of Brazil, Ind., manufacturers of mining machinery, is planning the erection of a two-story brick building, 150 ft. by 40 ft., to be used for offices and drafting rooms. A large foundry will be built next year. Recent orders include the following: Enterprise Coal Company, Bicknell, Ind., one pair 15 by 30 hoisting engines; Union Coal Company, Hymera, Ind., one pair 20 by 36 hoisting engines; Egyptian Coal and Coke Company, Harrisburg, Ill., two pair 18 by 32 hoisting engines; Quemahoning Coal Company, Somerset, Pa., one 20-ft. fan; West End Coal Company, Scranton, Pa., one 8-ft. fan; Standard Supply and Equipment Company, Scranton, Pa., two 15-ft. fans; Meadow Brook Coal and Coke Company, Fairmont, W. Va., one 12-ft. fan; Erie Coal and Coke Company, Meyersdale, Pa., one 12-ft. fan; Virginia Iron, Coal and Coke Company, Bristol, Va., one 20-ft. fan.

It is stated that the proposed car wheel combination, recently formed under the name of the National Car Wheel Company, acquired the concerns on the basis of 35 per cent in bonds and 65 per cent in preferred stock. The common stock, which is issued for good will, patents, etc., is to be given on the basis of ¼ per cent for gross sales, ¼ per cent for gross profits and ½ per cent for net profits. It is announced that no stock will be offered to the public. The company has an authorized capital of $9,000,000. The capital thus far issued, according to a recent statement, consists of $404,000 of first mortgage 6 per cent 20-year sinking fund gold bonds, $751,400 7 per cent cumulative preferred stock and $1,304,800 of common stock. The National Car Wheel Company has purchased so far the Keystone Car Wheel Company, of Pittsburg, Pa.; the Rochester Car Wheel Works, of Rochester, N. Y.; the Cayuta Wheel and Foundry Company, of Sayre, Pa., and the Maher Wheel and Foundry Company, of Cleveland, O.

SOCIETIES AND TECHNICAL SCHOOLS.

COLORADO STATE SCHOOL OF MINES.—Mr. A. B. Frenzel, of Denver, has notified President Alderson of a prize of $250 for the student who will prepare the best paper on "Tungsten in Colorado." A committee of three prominent members of the Colorado Scientific Society will award the prize. Mr. Frenzel, who has been appointed State Commissioner for Rare Minerals, in connection with the St. Louis Exposition, intends to offer a similar prize each year for a paper on some rare mineral found in Colorado.

AMERICAN CHEMICAL SOCIETY—NEW YORK SECTION.—The first regular meeting of the season was held at the Chemists' Club, in New York, on October 9. The following papers were read: W. J. Waring, "The Volumetric Determination of Zinc"; E. H. Miller, E. J. Hall and M. J. Falk, "The Reduction of Lead from Litharge in Preliminary Assays and the Advantages of an Oxide Slag."

Mr. Waring's paper was discussed by Mr. Stone, the chairman and others, particularly in reference to the conditions of acidity and dilution best favoring the separation of cadmium and lead without loss of zinc.

Prof. Miller read the paper on the reduction of lead from litharge, and explained the advantages of a soda-litharge charge in assaying, whereby results almost equal to the corrected assay system were obtained in one operation, the crucible fusion giving the advantages of a scorification and fusion combined.

TRADE CATALOGUES.

The Fort Wayne Electric Works, of Fort Wayne, Ind., issues a little pamphlet of 52 pages, describing its type K, single-phase integrating induction wattmeters. The pamphlet contains a general description of the wattmeters, with directions for installing, operating and testing them.

"Galvanum," a compound for protecting galvanized iron and steel surfaces, is described in an illustrated pamphlet issued by the Goheen Manufacturing Company, of Canton, O. This compound is claimed to adhere to galvanized surfaces where ordinary paints crack and peel.

The "Hercules" chain for conveyors is described in a folder issued by the Jeffrey Manufacturing Company, of Columbus, O. This chain is stated to be practically dust-proof and to be made of malleable iron, solid link and steel side bars, with either riveted, coupling or lock-nut pins. The chain is made in eight sizes, with pins from 7-16 to 1 in. in diameter.

"The Art of Tanning and Currying Belt Leather" is a pamphlet issued by Charles A. Schieren & Company, of New York, describes the methods used and the care taken in the preparation of the company's Dixie belt leather. The company's tannery is situated at Bristol, Tenn. The company states that its belts are used in some very large electric power and light plants.

The H. W. Johns-Manville Company, of New York City, issues a folder of unique design, calling attention to the contracts for roofing for the United States Army recently secured by the company. These contracts were for 11,120 rolls of roofing paper, and for 2,900 rolls of roofing paper, each to contain 216 sq. ft. The company filled the first order within 30 days of its receipt, and the second within 10 days.

A pamphlet recently issued by the American Well Works, of Aurora, Ill., as form 38, contains sample pages from the last general catalogue of that company, describing deep well pumping appliances. These include Chapman's air water lift, by which 500,000 gallons of water can be pumped per day from a 4-in. artesian well, and the revolving hydraulic well sinking apparatus, which has been used with very much success in the Texas oil fields. By this device a well over 1,000 ft. deep and 5 in. in diameter has been sunk, tubed and completed in 24 hours. The company states that its enlarged works are equipped with all the latest appliances, including ample brass and iron foundries, a machine shop with a large electric travelling crane, etc.

Elevating, conveying and power transmission machinery is the chief subject of its complete catalogue No. 72, sent out by the Jeffrey Manufacturing Company, of Columbus, O. This catalogue of 378 pages describes in detail the various types of chain belting and steel cable conveyors made by the company, and contains numerous illustrations showing how the conveyor looks in operation at power plants, coaling stations, coal washeries, mines, docks, lime kilns, factories, rock crushing plants, gold mills, dredges, etc. The company also makes the Century rubber belt conveyor, the Columbian vibrating screens, helicoid steel conveyors; also spur bevel and mitre gears, friction clutches, ore skips, tubs and dumping cars, and the Jeffrey steam tipple, and the automatic cross-over dump for coal mines.

The Turner Brass Works, of Chicago, Ill., issues a handsome little pamphlet of 56 pages, describing it as Catalogue No. 22. The pamphlet describes various gasoline appliances made by the Turner Works, particularly gasoline blow torches. These torches have double jet burners, one valve controlling the gas and another the air, thus enabling the operator to mix the gas and air in right proportions to secure perfect combustion and maximum heat. The torches are made in several sizes, the largest being intended for heavy soldering, tempering and brazing for electric line work, car builders, etc. The torches are also for laboratories and assayers, and can also be fitted to crucible furnaces made by the company for smelting small quantities of metals and alloys. The Straight-Turner brazing forges are also described in the pamphlet.

SPECIAL CORRESPONDENCE.

Denver. Oct. 10.

(From Our Special Correspondent.)

The smelter at Salida of the Ohio & Colorado Smelting and Refining Company, with headquarters in Denver, is now treating 800 tons of ore per day and has about 300 men on the pay-roll. The new roasters are expected to be in full operation within the next 30 days. The ores come from Leadville, Lake City, Ouray and the old district of Monarch, which is experiencing something of a revival. The plant also receives ore from Tintic and Park City, Utah, and from the Wood river, Boise and Coeur d'Alene districts in Idaho.

Superintendent Groves announces that the Telluride mill at Colorado City, which was forced to stop work several weeks ago by a strike of its union employees, will resume operations with non-union men. The mill is receiving ore daily and has a large supply on hand.

There is practically no change in the strike situation at Telluride, San Miguel county. Supplies are being taken to the mines, and this is considered an indication that the mine managers are intending to resume work soon. The local Mine Owners' and Operators' Association, of which every mine manager in the district is a member, is awaiting the outcome of the strike at Cripple Creek.

Every day shows an increase in the number of miners going to work in the Cripple Creek district and the railroad officials report that traffic is steadily approaching normal. As long ago as Oct. 4 the Short Line alone handled from 20 to 25 cars of ore per day, the ore for the most part being shipped to the Standard mill of the United States Reduction and Refining Company, at Colorado City. In spite of strike officials, union men are returning to work, and renouncing allegiance to the Western Federation of Miners. There are now more than 1,300 men on the pay-rolls of the mines which were closed by order of President Moyer's local executive committee, and every individual is a non-union man, so far as the Western Federation of Miners is concerned. On October 5 the mine owners and operators at a meeting resolved that thereafter no member of the association should grant a lease to any member of the Western Federation of Miners, or to any lessee having in his employ a member of the Federation. Another resolution adopted provided for the establishment of a permanent labor bureau, similar to that in the Coeur d'Alene district.

After the meeting the secretary said that within 30 days the district would be producing its usual tonnage. President Moyer, of the Western Federation of Miners, has been in the district often during the past week, visiting the different unions, his visit being said to be more for raising funds than on account of the strike. It is said that the Federation fund has suffered so much from the heavy drain of many prolonged strikes that it is now practically dependent on voluntary contributions for its financial existence.

San Francisco. Oct. 17.

(From Our Special Correspondent.)

The California State Mining Bureau has issued a detailed statement of the production of mineral substances in that State, showing a total of $35,069,105 for the year 1902. The relative standing of the several counties for the year, all mineral products being considered, is given here. Some counties produce gold alone, and others yield petroleum, borax, quicksilver, copper, etc. The rank of the counties for 1902 was: Shasta, $3,730,049; Kern, $3,481,926; San Bernardino, $3,308,002; Calaveras, $2,371,013; Nevada, $2,155,839; Tuolumne, $1,830,329; Los Angeles, $1,697,932; Amador, $1,679,113; Siskiyou, $1,094,745; Placer, $1,018,487; Butte, $926,251; Orange, $824,742; Trinity, $731,261; Fresno, $670,058; Alameda, $666,838; Mariposa, $647,298; San Diego, $562,730; Sacramento, $555,138; Mono, $549,298; Ventura, $483,986; Santa Clara, $411,112; Napa, $410,968; San Francisco, $395,100; El Dorado, $381,578; Plumas, $381,203; Riverside, $334,622; Sierra, $332,466; San Mateo, $330,745; San Benito, $328,231; Santa Barbara, $315,550; Lake, $288,231; Marin, $206,600; Santa Cruz, $205, 296; San Luis Obispo, $200,391; Sonoma, $198,803; Colusa, $194,500; Inyo, $184,414; Solano, $170,140; Yuba, $155,632; Madera, $121,151; Humboldt, $79,555; San Joaquin, $70,598; Tulare, $62,398; Contra Costa, $55,141; Monterey, $39,250; Lassen, $23,654; Stanislaus, $19,026; Kings, $19,000; Alpine, $14,129; Mendocino, $9,898; Del Norte, $5,450; Tehama, $3,500; Merced, $1,656; Yolo, $450; unapportioned, $73,619. Total, $35,069,105.

Shasta County is still in the lead, though it shows a falling off of over $3,000,000 from 1901, due to the miners' strikes and to the price of copper being lower. Shasta county owes its precedence to the copper, Kern county to the oil, and San Bernardino to the borax product. The leading gold producing county no longer heads the lists each year. Gold is more widely disseminated than any other mineral substance, having been mined in 1902 in 35 out of 57 counties in the State.

The county which produces the largest number of mineral substances is San Bernardino, with 16 products. Los Angeles county has 13 mineral products, which are commercially utilized, and Riverside has 12. Only three counties made no mineral production—Glenn, Modoc and Sutter.

At present mining affairs are rather quiet. In many counties the water has given out altogether, and the mines will be idle till the winter rains begin in November, when the streams and ditches will fill again.

Arrangements have been made with eastern men for resuming work on the Wildman-Mahoney mines at Sutter creek, Amador county, which were shut down some months since at the time of the miners' strike. The Pioneer mine, adjoining the Wildman, was recently abandoned after several years' prospecting with no results and the reorganized company is to take in this property and connect it with the Wildman, which is already connected underground with the Mahoney. The Pioneer plant will be a distinct advantage to the Wildman-Mahoney Company in every way. The mines have a record of over $3,000,000.

The owners of the Champion mine, at Nevada City, have paid off all the employes, but have not as yet resumed work. Somebody will be found to take the stock of the two principal stockholders, who declined to pay the assessment, and then work will doubtless go on again.

After a long continued shut-down at the Argonaut

mine, Jackson, Amador county, during litigation with its neighbor the Kennedy, work has again been resumed. The shaft is to be repaired. This mine was formerly a large producer.

Nevada City, Nevada county, local papers are congratulating themselves and the citizens that there are now more men employed in the various mines of that old district than ever before in spite of the fact that the largest mine in the district, the Champion, has been closed down for a time.

It is stated in San Francisco that the presence of the Mitchell brothers, of the Mitchell Consolidated copper mine at Cananea, Mex., have to do with the purchase of the smelter of the Copper King Company, at Bay Point, Contra Costa county, which has been closed down ever since the shut-down of the Copper King mine, in Fresno county. If the Mitchells do not succeed in obtaining this smelter it is stated to be their intention to erect one near Antioch, on the San Joaquin river at the northern head of San Francisco bay. Ore is to be furnished from copper mines on the Mexican gulf coast, to be reached by the new Kansas City & Orient road to Topolobampo.

The electrical plant of the Bay Counties Power Company, at Nimshew, Butte county, is about completed. It will furnish 20,000 h. p. to add to the already extensive plant of the company and will be a boon to the mining interests of Butte and adjoining counties.

One dredge is doing successful work in the American river under Cape Horn, not far from Colfax, Placer county. The men in charge of the machine state that much of the river near the point is free from boulders and they expect rich returns.

The Golden Drift Company has obtained a right to mine 36 acres of the land under the town of Dutch Flat, Placer county. Mining has been carried on about there since the early days, but the gravel immediately under the town has never been touched. Now that the town is decadent it is thought proper to get the gold from under the old houses and streets.

Spokane. Oct. 10.

(From Our Special Correspondent.)

The Jumbo, at Buffalo Hump, Idaho, has completed its 10-stamp mill, making 14 stamps in all. It is treating about 2½ tons per stamp per day. Frank Brown, managing director, is considering the erection of 10 more stamps. The Lucky Lad, in Buffalo Hump, has erected a two-stamp mill.

Drifting has begun on the War Eagle, up Placer creek, in the Coeur d'Alenes, Idaho. A number of improvements are being made at the Tiger-Poorman mine at Burke, owned by the Federal Lead Company. A new dam is being built at the upper lake, 270 ft. long and 30 ft. high. The newly formed Duquesne Mining Company, of Pittsburg, promoted by W. T. Hales, of Wallace, has completed the purchase of the Rock Island group, near Mullan, for $20,000. The group was staked in 1889, and has been bonded several times. The Hercules, which has opened a large body of silver and lead ore in its lower tunnel, near Burke, is owned by the same holders who have developed it. By his marriage with Miss Ellen Day, one of the owners, Ed. Boyce, late head of the Western Federation of Miners, is making a fortune, and is not as active in his denunciations of capital. The Hercules people were considering the purchase of the Frisco mine and mill, but have dropped the project as the mill was not large enough. They are putting in a new electric light plant. The Ajax Company is pushing a cross-cut tunnel in hope of getting the Hercules lead, as the Ajax group adjoins the Hercules. The Happy Day, another extension, is driving a 500-ft. tunnel after the Hercules vein. The Monarch Company, northeast of the Hercules, has its adit in 2,680 ft.

Howard Kressly, the defaulting broker who, as secretary of the Lucille Dreyfus Mining Company, of Spokane, forged and over-issued more than 1,000,000 shares of its stock, has pleaded guilty to obtaining money under false pretences and is serving a five-year sentence in the penitentiary. Other charges against him will doubtless be dropped.

The mineral display at the Spokane Interstate Fair, now in progress here, is excellent. Ymir, B. C., received the award for the best showing of free gold ores and for the best individual free gold specimen—a beautiful piece of nearly virgin gold weighing 15 pennyweights, with only a trifle of quartz. It was from the Spotted Horse mine. Poplar creek, in the Lardeau, has an exhibit of free gold ores which collectively took first prize. One specimen weighing 320 lb. is studded with gold.

Victoria, B. C. Oct. 6.

(From Our Special Correspondent.)

Returns of the season's operations in Atlin are generally favorable, although early in the year work was seriously hampered by high water, followed by labor troubles. Good returns have already been received from McKee, Birch, Wright, Otter, Slate and Pine creeks, while there is every prospect that the clean-up on Boulder creek will be exceptionally heavy. The British-American Dredging Company recently completed the installation of a dredging plant, at a cost of $200,000, and more attention has been directed to the development of quartz prospects. Last month 1,900 acres of bench and creek leases on McKee and Eldorado creeks changed hands, and preparations have begun for equipping this property for mining operations next spring.

The large Garretson furnace at the Crofton smelter, on Vancouver island, is in use. Regular shipments have begun from Marble Bay, Texada Island. The Lenora, at Mt. Sicker, continues to ship steadily, and the grade of ore is reported higher. Coke is being imported from Seattle as well as Comox, and a shipment of 3,000 tons has been delivered in box cars, via the Great Northern.

In the Bridge river district development work has been prosecuted at the Ben D'Or, Lorne and Pioneer mines, while the Anderson lake mines have made a very satisfactory showing. Placer enterprise at North Fork has, however, been somewhat restricted by water shortage.

Two claims on Springer creek, in the Slocan City division, the Cripple Stick and Cripple Stick Fraction were bonded last week to Englishmen. This is the first deal made in that section this year. Ore shipments compare unfavorably with last year's returns.

An effort is being made to investigate placer mining possibilities in the new Poplar creek district. Prospecting work so far has been fairly encouraging, a shaft having been sunk to bed-rock, some 50 ft., showing good prospects.

The reorganization of the Sullivan Mining Company, in the Kimberley district, East Kootenay, is proceeding satisfactorily, and there is good reason to believe that the capital required will be raised by the issue of 5 per cent first mortgage bonds. The mine is now shipping ore from the dump at a profit, 300 tons having been sent to the Nelson smelter during the past month. Mining is resumed.

San Luis Potosi. Oct. 5.

(From Our Special Correspondent.)

In Michoacan, near Morelia, the Negociacion Minera de Oro, with J. R. Ambrosius as president and general manager, has been organized to work the Juape de Arriba mines, having 200 pertinencias with free milling ore. Near Coapa, New York men are examining the Santa Emilia and adjoining copper properties. In the district of El Oro and Tlalpujahua there are some 50 companies organized or in process of organization. The Old Abe has a three-compartment shaft down 175 ft.; the Reliance a single compartment down 160 ft.; La Joya of Progreso y Anexas, a three-compartment shaft 350 ft. deep; Sullivan, a two-compartment, down 175 ft.; Reforma, three-compartment, down 600 ft.; Pleyades, three-compartment, down 500 ft. and crosscutting; Chihuahua, Aldebaran and Noche Buena, all two compartments and down about 100 ft. deep, with steam hoists being erected. The Aurora, American, Colon Descubridora and Perseo all have three compartments down 100 ft., and hoists on the ground or ordered. The Lill shaft, two compartments, is 60 ft. deep; Jupiter, three compartments, 75 ft. deep; Victoria, three compartments, 335 ft., with drifting along the vein at the 300-ft. level; Santa Rosa, three compartments, 450 ft., will be continued 300 ft.; La Estrella, two compartments, is 100 ft. deep; La Amistad, three compartments, 140 ft., and La Esperanza has two new shafts down 1,000 ft., and the old one 1,250 ft. deep.

London. Oct. 5.

(From Our Special Correspondent.)

It is difficult to write about a practically non-existent theory, so I have said very little in my letter recently about the state of the mining market. For a long time there has been an absence of speculation and booms are becoming unknown quantities. For one thing, the extra taxation due to the war has diminished individual surpluses, which were hitherto available for mining speculation. In the second place, every speculator bought shares in South African gold mining stock during the war, with the expectation of clearing a handsome profit when the rise took place. As is now a matter of public notoriety, this rise has not yet occurred, chiefly because of the difficulty of obtaining labor, and much available money is therefore locked up. In making investigations as to who are the present holders of this class of shares it is interesting to find among them many mining engineers of position, whose names one scarcely connected with speculation on the Stock Exchange. In discussing with them personally the prospects of a rise, I find that they do not consider it speculation, but sound investment. The shares they hold are mostly those of companies that paid handsome dividends before the war, and in some cases have resumed the payment of dividends. This point of view is that now is the time to buy such shares, for the quotations cannot well go much lower, while there is a prospect of good dividends and a rise in the price. This, no doubt, in the main is good philosophy, but for my own part I am rather sceptical as to a rise in the immediate future, and as we have not yet had detailed costs under the new conditions it is difficult to estimate what the profits and dividends may be.

The report of the Electrolytic Alkali Company, which operates the Hargreaves-Bird process for producing bleach and soda, for the year ended August 31, is a disappointing document, for it shows merely a nominal profit, and both preference and ordinary shares have to go without any dividend. As a great deal will be said in the press by writers who have no intimate knowledge of the subject, and perhaps also by some of the owners of rival processes, it is desirable that I should enter into details here. The lack of profits is entirely due to the fall in prices of the products of the company and has nothing whatever to do with the process itself, which is scientifically and practically a successful one. I have had for many years an intimate knowledge of the process and of its inventors and financial supporters, so I naturally wish to counteract to some extent the many deprecatory article that are written by people who have not the same knowledge or motives. Though the process is an excellent one, it has the disadvantage of producing chemicals that are already in large supply. Both the soda and the bleach are admitted to be of superior quality, so that the company can always sell as much as it can produce, but it is not possible to charge more than market price. Another disadvantage is that the company produces nothing else. On the other hand, its competitors are all large chemical companies, which have a multiplicity of other products, and can afford to sell their soda and bleach at cost or even lower. As a matter of fact, some of the older makers are waging a commercial war against the process on these lines. Also the press and some shareholders are inclined to assert that they were misled by the promoters of the company. I wish to say, therefore, that there was no intermediate promoters' profit in the formation of the company, but that the owners of the patent and property sold direct to the public, taking only sufficient cash to pay expenses, and the remainder of the purchase price in deferred shares. Further, there is this particularly important point, that they have not sold their deferred shares, but have stood to obtain such profits as they should make, only when the company was an assured success.

The doings of the Etruscan Copper Estates, Limited, to which I have referred, many times in these columns, continue to be as mysterious as ever. Two months ago the company started its first concentrating mill on lead ores, to the astonishment of those who were on the lookout for the development of the alleged copper resources. No results have ever been published relating to the work done on the lead ores, but instead, there is another circular being sent out, stating that in the future copper ores are to be treated instead of lead. It is also announced that the copper smelter is at work on 400 tons of 4 to 5 per cent ore per week. How long the smelter will run before the supply of ore is exhausted remains to be seen. A collection of the literature issued by this company affords amusing reading, for it contains more unfulfilled promises than any similar case that I can remember. In fact, the anticipations hardly ever materialize. I thing it only fair to Mr. Vavasour Earle, the leading spirit in the company, to say he really believes in the future of the property, in spite of the many adverse reports presented by independent mining engineers. And it should be remembered that he is not by any means a London "promoter" or an irresponsible adventurer, with a fake mining scheme, but a cement manufacturer with a large and high-class business. The only adverse comment that can be made is that hitherto he has had no experience in the finance or technology of mining, and that he has no independent and unprejudiced sources of information as to the status and ability of the consulting mining engineers, who have reported on the property, or of the mining engineers and metallurgists who are in the employ of the company. For his own sake, and for the sake of shareholders who have implicit trust in him, the hope may be expressed (albeit a remote one), that the mine may yet develop into a different property from what it undoubtedly now appears.

Perth, W. A. Aug. 30.

(From Our Special Correspondent.)

The Euro Mines.—This is a London company, which was expected at one time to open a very big mine, but has been definitely closed down, owing to the poorness of the reef at depth. The mill is to be sold at auction.

Kalgoorlie.—The deep bore holes at the southern end of the Great Boulders property are progressing well, and at a vertical depth of 1,352 ft. a fine body of ore has been cut, 9½ ft. wide, assaying 15½ dwts. per ton. The ore is similar to the main lode, though carrying

more quartz. It is believed to be a continuance of the Horseshoe Boundary lode. The main shaft is down 1,750 ft., and the foundations are all ready for the new winding plant. The Oroya north block has sunk the winze in No. 10 level, 38 ft. in ore averaging over 5 oz. per ton. At the South Kalgurli development has been resumed under the management of Mr. Ralph Nickolls. It is intended to sink the main shaft to 1,000 ft. The Associated Northern, which has been going through troublous times of late, owing to the depletion of the very rich ore body, is now after the rich ore cut by diamond drill.

Mount Margaret Goldfield.—Laverton is quiet, but the approach of the railway extension is causing steady preparation for working many more leases, and the public battery is assisting prospectors to hold out. Prospecting parties are exploring the back country further east and north, and one party reports finding a good watered track through to the South Australian border.

The recent rush to a new alluvial find at Erlistown has drawn a good number of men, some of whom are getting good returns. Two men came into Laverton with 51 ozs. from one claim.

Murchison Fields.—Work in and around Cue and Day Dawn (Great Fingall) is going on well, and the diamond drill is prospecting at several points. The Emperor mines have started their mill again. One of the London directors, Mr. Wm. Griffith, is at present at the mines. The reef at the 400 ft. level is 4 ft. wide and shows good gold. The old Fields Reward mine (Yalgoo) is being re-opened, after several years' idleness. The Peak Hill Gold Fields Company's return for July was 2,730 ozs. of gold. The mine appears to be opening up satisfactorily with depth.

Northwest Fields.—Parliament is now considering the question of the Pilbarra gold field railway. Mr. A. E. Morgan, who has just been to Nullagine with Mr. Frecheville, to inspect the banket formations, etc., has made offers for the construction of this much desired line to tap gold mines at present idle for want of easy transport, besides tin, copper and coal deposits.

The Government has introduced a new mining bill, with the intention of consolidating all existing acts, and simplifying the mining laws. But ministers sitting in their offices do not appear to grasp the actual facts and requirements of the country. Neither the struggling prospector, nor the capitalist can get fair consideration while labor unions control the action of government, as at present. The land settler is helped at every turn, but no practical assistance is given to the mining man. The labor unions are blindly doing all possible to hamper the development of the country.

Sydney, N. S. W.

Tasmania.—The directors of the Mount Lyell mines have revised the miners' wages so as to make the rate paid those working at the North Mount Lyell blocks correspond with the rate paid at the big mine. This is causing some discontent among the employes of the North Mount Lyell, who have been paid a higher rate in the past.

Victoria.—The gold yield in Victoria last year was valued at £3,062,028. Dividends amounting to £472,135 were distributed by 69 companies, an increase of £44,137 over the previous year.

The gold returns of Bendigo are improving. For the past seven months the yield has been 15,060 oz. in excess of the same period of last year.

The coal output of Victoria for 1902 was 225,164 tons, or an increase of 15,835 tons. Two coal companies paid £11,978 in dividends.

Auckland, N. Z. Aug. 30.

(*From Our Special Correspondent.*)

Gold Dredging.—Owing to adverse weather the returns have on the whole been below those of last year. The Molyneux river, owing to heavy rains and melting snow, has, as a rule, been far above normal winter level. When frost came, it was so unusually severe as to prevent most of the Otago dredges from working. During a few weeks, however, weather conditions were favorable and the Molyneux was fairly low, consequently many of the dredges, notably the well-known Hartley and Riley, did extremely well.

Hauraki Gold-field.—During the four weeks ending August 15 the Waihi Company crushed and treated 17,356 tons for a return of £51,586 ($257,930), equal to $14.45 per ton. During August the Talisman Consolidated Company treated 4,216 tons of quartz for a return of £8,836 ($44,180), equal to $10.18 per ton. This is the highest return yet obtained by this company, that for the preceding month, when 4,200 tons yielded bullion valued at £8,610, being the previous best. The working costs for August amounted to $7.40 per ton, the items being as follows: Mine development, $1.69; mining, $2.52; treatment, $2.82; general expenses, 33c.

Other leading returns for the month of August are: New Zealand Crown, £6,642 ($33,210), from 3,200 tons; Komata reefs, £2,425 ($12,125), from 1,200 tons; Tavnia Broken hills, £2,012 ($10,060), from 50 tons; Hardy's Premier mine, £1,707 ($8,535), from 476 tons; Old Hauraki (Coromandel), £1,550 ($7,750), from 85 tons and 269 lb. of picked stone; Bunker's hill, £2,109 ($10,545), from 41 loads of general ore and 477 lb. of picked stone.

GENERAL MINING NEWS.

Chesapeake & Ohio Railway Company.—Coal and coke shipments in August and the two months of the fiscal year, beginning with July, were as follows, in short tons:

	August.	July-August.
New River	229,111	472,047
Kanawha	171,544	317,478
Kentucky	13,573	26,706
	414,228	816,231
From connections	17,992	32,096
Total coal	432,220	848,327
New River	28,824	53,874
Kanawha	4,651	12,112
	33,475	65,986
From connections	.....	51
Total coke	33,475	66,037
Grand total	465,695	914,364

Compared with the first two months in the last fiscal year, there is an increase of 723,303 tons coal and 46,594 tons coke, principally in shipments to tidewater,

(*From Our Special Correspondent.*)

The list of Lake Superior iron mines that have reduced forces or closed entirely is about as follows: Vermilion range, Soudan closed, 500 men out; Mesabi range, nothing as yet, though steam shovel mines will be idle as soon as navigation ceases; Gogebic range, Ironwood group of the Oliver Iron Mining Company, 500 men out; Ashland mine, 250 men out, other producers 200 men out; Marquette range, Ishpeming group, Oliver Iron Mining Company has closed its section 21 mine, also its Volunteer, and will shut down its Winthrop at the close of the shipping season. These three employed nearly 500 men. The same company's section 16 mine, Lake shafts, and others, have been cut 190 men. The Cleveland Cliffs Company has cut its Ishpeming mines by 370 men, most of whom come out of the Cliffs and Lake mines. On the Menominee range there is to be a cut at Crystal Falls mines, approximating nearly 400 men. Several small properties and explorations will now close down, letting out perhaps 250 men. The Michigan will close, letting out 60 men. These are chiefly development propositions that were more or less hopeful, but now are finally passed on. There will be a small cut at Chapin and possibly at the Pewabic, possibly also later at the Aragon. The Iron River group will be materially reduced, possibly by 300 men. The Cundy mine is closed, letting out 145 men.

ALASKA.

(*From Our Special Correspondent.*)

Advices from the Yukon region are to the effect that river navigation is rapidly closing. Low water has seriously impeded navigation for some weeks and only half cargoes have been carried by the river steamers. Several thousands of tons of supplies en route to the Klondike are stacked up on the banks of the river and cannot be moved.

Better news arrives from the Nome region, where miners have been experiencing good weather without storms and the miners have, in consequence, been enabled to keep on with their work later than usual. It is thought that 2,000 people will winter at Nome this season.

ARIZONA.

COCHISE COUNTY.

Wolverine & Arizona.—S. Hunt, superintendent of this mine, near Bisbee, may soon equip the property with additional machinery, including air compressor and power drills.

GRAHAM COUNTY.

Clifton Consolidated Copper Mines of Arizona, Limited.—This company, capitalized at 500,000 shares, of £1 each, took over the properties of the Morenci Copper Mines, Limited, and the Clifton Arizona Copper Company, Limited, near Morenci. According to the report of manager Maurice Fountaine for the year ending June 30, the company now has a sufficient power plant and machinery on the Missing Link and Great Western groups for carrying on necessary development work.

PINAL COUNTY.

Troy-Manhattan.—The smelter at Troy is running full capacity on the higher grade ore taken from development.

YAVAPAI COUNTY.

Hidden Treasure.—Reduction works are said to be in view for this property, near Prescott. E. S. Prescott, of Arizona, is the owner.

Oro Mining Company.—This company, at Minnehaha, is receiving machinery for a 15-drill compound air compressor. The hoist is being removed to a more suitable place. At present only a small force is at work.

CALIFORNIA.

AMADOR COUNTY.

E. J. Harrah & Co., of Oakland, are making arrangements to work some 25,000 tons of quartz tailings at Sutter creek by a new process.

Argonaut Mining Company.—Work has begun at this mine, at Jackson, and the shaft is being repaired after the long shutdown due to litigation with the Kennedy.

Kennedy Mining Company.—At this mine, Jackson, J. F. Parks, superintendent, the new hoist is working. The new skips raise two tons a trip. Foundations are ready for 20 more stamps at the mill.

Moore.—W. A. Nevills is arranging to start work on this mine, thinking labor troubles are about over.

Oneida.—At this mine, between Sutter creek and Jackson, some rich ore has been encountered.

Wildman-Mahoney Mining Company.—This company, at Sutter creek, John Ross, Jr., manager, is to be reorganized, and the property of the Lincoln taken in. The properties have two mills of 40 stamps each and were formerly profitable.

BUTTE COUNTY.

United Gold and Copper Company.—This Chicago company, which took hold of the Spring Valley quartz mine, near Cherokee, recently, is busy with development. An 800-ft. crosscut tunnel is finished that cuts the vein 500 ft. below the surface. The company is preparing to put up a mill.

CALAVERAS COUNTY.

Hercules Horseshoe Mining Company.—This company, north of Murphy's, which recently bought several mines worked for years by Cunliffe & Driver, is at work grading for a small mill.

Kenross.—At this mine, near Whisky Slide, a mill is being built, and work on the ditch is going ahead.

Mayday.—Work has been resumed on this mine at Murphy.

Orange Home.—This mine, at Whisky Slide, is being developed by J. E. Seroy and J. R. Morgan, representing San Francisco men. They have 4 ft. of gravel.

Red Bird.—This mine, in Chili gulch, has been bonded to a Chicago company, which has agreed to begin work in 60 days. The property contains 30 acres of a gravel channel.

EL DORADO COUNTY.

Baltic.—Preparations are being made at this mine to put in a new cyanide plant.

California Jack.—It is reported that this mine, at Georgetown, has changed hands and operations will soon be resumed.

El Dorado Copper Company.—W. E. Everson, the new superintendent of this property, is to start at once on the work of sinking a new three-compartment shaft.

Mammoth.—At this mine, Webber creek, a new roller quartz mill has been put in.

Monarch.—A new 20 h. p. hoist is being installed at this mine, near Nashville.

Mount Pleasant.—This mine, near Grizzly Flat, now owned by men from Angels camp, is being developed in search of the ore body lost some time ago.

Noonday.—At this copper mine, A. C. Morrison, superintendent, 22 men are now employed. Three eight-mule teams are hauling ore to the railroad to be shipped to the Peyton Chemical Works, at Peyton.

Rosecranz.—This mine, near Georgetown, has been bonded to Colorado men, who will begin work at once.

Vandalia.—This mine, at Canyon, owned by the Rosenfeld brothers, of San Francisco, has temporarily closed down. The mine has a very large cyanide plant.

HUMBOLDT COUNTY.

Most of the placers around Orleans have been closed down for a time, owing to lack of water.

Pioneer.—A quartz mill is to be put up this fall at this mine, near Orleans.

INYO COUNTY.

Sanger & Mairs.—M. Jacoby, of Los Angeles, who has a bond on these copper claims, in Saline valley, has been visiting the mines, with a view to operating them. The copper deposits are said to be large, but some distance from the railroad.

NEVADA COUNTY.

Grey Eagle.—A 5-drill air compressor has been provided for this mine, near Washington. The property has been idle some time for lack of water.

Pennsylvania Mining Company.—This company, at Grass Valley, is putting in use a new system of mine ventilation, which is expected to greatly improve underground conditions.

Yuba.—This mine, at Maybert, was bonded by George W. Peer & Co., and will be unwatered and reopened.

PLACER COUNTY.

Boulder.—Portland, Ore., men have bonded this mine at Ophir, and are going to sink the shaft.

California Mining Company.—This company, at Shady Run, has installed a 10-stamp mill. The main tunnel is in 1,400 ft.

Chicago.—The company which started to unwater this mine, near Penryn, has abandoned the operation, being unable to control the water without buying new machinery.

Crosby Gold Mining and Milling Company.—At this property, near Lincoln, Fred Crosby, superintendent, a rich strike has been made. After cleaning out the old works, drifts were started at 340 ft.. The ore averages $35 per ton.

Sacramento Dredging Company.—This company, operating on the American river, near Colfax, has completed its flume, and put in a water wheel to operate the pump for supplying water for washing.

South Yuba Mining and Development Company.—This company has applied to the United States Debris Commission for permission to mine by the hydraulic process. The mine is near Emigrant Gap and will drain into Diamond creek, which reaches the Yuba river. Debris dams are to be built.

PLUMAS COUNTY.

Fairplay.—Tom Kee, manager of this mine at Scales, has applied to the California Debris Commission for permission to mine by hydraulic process, the mine to drain into Rock creek.

SAN DIEGO COUNTY.

Amended locations have recently been made to the various lithia mica mines at Pala, so as to define the respective boundaries and avoid any trouble in the future.

SANTA CLARA COUNTY.

Santa Tereso.—These mines, near San Jose, owned by Boston men, have been shut down, throwing about 50 men out of work. The mines were being reopened, and some $60,000 has lately been expended upon them. apparently without finding the ore expected.

SHASTA COUNTY.

Work on the branch railroad at Delamar from the smelter to the Anchor mine has commenced. The capacity of the Bully Hill smelters is to be increased.

Calumet.—This old property, near Redding, which has been idle for some eight years, is being reopened under superintendence of William O'Donald.

Midas Mining Company.—The trouble between the management of this company, at Knob, and the miners has been settled, and the men may board where they please.

Uncle Sam.—It is stated that this old mine, near Kennet, formerly operated by the Sierra Buttes Mining Company, Limited, is to be reopened by a San Francisco Company, which is examining it with a view to purchase.

Verde.—Delevopment work has commenced on this copper group, near the Shasta King and Windy Camp group. There are twelve claims in the property.

SISKIYOU COUNTY.

Blue Ledge.—An eastern company now holds the bond on this mine, on Siskiyou mountain, near the Oregon line. The report on the property was favorable, and as soon as matters connected with the second cash payment are settled, it is expected work will start.

Sheba.—Fry & McCauley have made a strike in this mine on Patterson creek.

SONOMA COUNTY.

There are about 150 men employed in the quicksilver mines at Pine Flat, and this force will shortly be increased by a hundred.

TRINITY COUNTY.

Gold Dollar.—Mark Manley has secured an option on the group by this name, near Junction City. There are 190 acres of auriferous gravel.

Three Peaks.—More miner's liens have been filed against this mine, though the property has good prospects. The mine is at Dorleska, and James J. Chambers, of Redding, is manager.

TUOLUMNE COUNTY.

Ajax.—H. L. Dykes and Paul Seller have settled their differences about this mine out of court, and Seller now has control of the property.

Rawhide Extension.—A contract has been let for sinking a shaft on this property, and six men have begun work.

YUBA COUNTY.

New Blue Point Mining Company.—This company, at Smartsville, is preparing to work, although the Anti-Debris Association refused a permit to hydraulic off the top ground over the auriferous gravel. Several miles of new flumes are to be built, and the property worked by dredger or elevator process.

COLORADO.

BOULDER COUNTY.

Livingston.—The last payment of $25,000 on this mine, sold a year ago for $65,000, was mad erecently on behalf of Attica, N. Y., men. The new company is planning extensive development.

Logan.—This mine, which has been a producer for nearly five years and a dividend payer for more than two and a half years, has a small vein that ranges from a few dollars up to $47 a pound.

Pittsburg and Colorado Mining Company.—This company, owning a group of claims on Sugar Loaf, has completed a new shaft house and installed machinery over the Mastodon shaft. The company is sinking a vertical shaft, now down 128 ft., from which drifts will be run to cut the ore shoots found in the Mastodon and Pride of the West. W. H. Ryer is manager.

Slide.—On the 1,000-ft. level of this mine, in the Gold Hill district, a crosscut was run into country rock for 34 ft., where a body of ore 8 ft. wide was struck, a foot of which is said to be high grade. Senator Teller and his brother, Willard Teller, are the owners, and have been operating the mine under the leasing system.

CLEAR CREEK COUNTY.

Capital Prize Mining Company.—This company, of Georgetown, will soon put in an air compressor and machine drills.

Continental Electric Power and Irrigation Company.—This company, of Idaho Springs, has decided to build a 200-ton cyanide mill for its mine at Empire.

CUSTER COUNTY.

Evening Star.—At this mine, near Querida, a rich vein of native silver is reported by G. W. Avery, operating the property.

P. & O.—A strike of telluride ore is reported at this mine, near Querida.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

The ouput of the mines for the month ending October 10 was in the neighborhood of 73,000 tons of all classes of ores. Resumption of shipments of iron ores and an increase in zinc will make production higher for October.

A. M. W.—Decker & Kyle have just completed a large structure near the A. M. W. mill for saving the zinc values in the tailings from that mill. They treat about 10 tons daily and are making a nice profit.

Belgian Frenchman Company.—Manager Stotesbury believes the Iron Silver shoots extend into Belgian territory. The shaft is down over 600 ft. Exploration work is carried on at the 485-ft. level. The bins are full of material that will average 40 to 50 per cent lead and 15 to 20 oz. silver.

Buena Vista Smelter.—This plant, which was shut down on account of the death of manager Morley, is to be operated steadily. Mr. Hinckson is the new manager.

Caribou Mining Company.—Shipments were resumed on October 12 of 100 tons a day to the Ohio & Colorado smelter.

Cold Basin Mining Company.—Another lot of ore has just been shipped that ran 4 to 10 oz. gold and 60 to 100 oz. silver.

Helen Gould.—The vein being followed on the main drift is about 5 in. wide.

Iron Silver Mining Company.—An explosion of giant powder in the 370-ft. level closed down the old Moyer shaft for a few days, but repairs have been made, and the property is again producing heavily. The opening of the old Tucson shaft on Iron hill is the most important news of the week. The shaft was originally sunk to the sulphides, and large bodies of this material opened, but in the early days the smelters did not handle that class of ore. The surface plant is being put in shape, and the company will mine these deposits on a large scale.

La Plata.—The final papers of transfer to the new La Plata Mining Company have been filed, and manager Deaner is arranging to lease the old workings in blocks.

New Home Mining Company.—A new drift in the third level is opening up some ore that is very rich, while only a streak assays 1,000 oz. to the ton. The main ore body runs about 20 oz. silver and 19 per cent lead. A large amount of new work is going on.

Ohio & Colorado Smelting and Refining Company.—Press dispatches which said that the plant at Salida was partially destroyed by fire were without foundation. The plant is running all its furnaces and expects to have its 12 new roasters going soon.

Oro Leasing Company.—The surface plant is in position, and manager John Curley announces that active work will soon start.

Two Bit Mining Company.—The company announces it will shortly resume work.

Valley Leasing Company.—Arrangements are under way to ship from the new ore body to the United States Reduction Company at Canon City.

Yak Mining, Milling and Tunnel Company.—The company is shipping some 2,000 tons a month, and is enlarging its surface plant. New machinery, including two high-pressure boilers is being installed.

SUMMIT COUNTY.

Minnie.—This property, on Mineral hill, is worked under lease, by R. W. Foote. There is a concentrating mill on the property, equipped with crusher, sizing screens, rolls and Hartz jigs, which recently made a carload shipment of heavy lead-silver concentrates.

Washington.—C. S. Newsom, manager of this mine, near Breckenridge, will build new reduction works.

SAN JUAN COUNTY.

Sutton Mountain Mining and Milling Company.—This company, of Silverton, will add electric drills to its mine equipment.

(*From Our Special Correspondent.*)

Betsy.—At this claim, in Galena Lion gulch, near Silverton, a vein is reported 2 ft. wide, with a small streak carrying very high values in gold and silver. The ore is a telluride. The claim is owned by D. B. Haggerty.

Belle Creole.—J. H. Reibel is working a small force on rich ore. Machinery will soon be put in to handle the water.

Big Colorado Mining Company.—The new 1,500-ft. flume is completed and the Pelton wheel is being installed in the new power-house near Silverton.

Calavarite.—One-half interest in this group, comprising the Calavarite, Sylvanite and Patzite claims, was recently sold by W. E. Lester to Frank Manney, of Telluride.

Champion.—The vein recently encountered has widened to 20 in. and values have increased. Fifty tons of ore await shipment.

Dewey.—Another rich strike is reported from this claim in Burrows park, operated by W. J. Hammond, of Ouray for Pittsburg, Pa., men.

Dutton-Gibson Group.—Several carloads of lead carbonates have lately been shipped to Durango.

Georgia Group.—This group in Arastra basin, near Silverton, consists of the Georgia, Idalia and Arastra Basin King. Many thousands of dollars have been expended in development, with no returns, until recently an 18-in. vein of very rich ore was accidentally uncovered at grass roots and has so far been followed for 100 ft. Shipments are regular.

Green Mountain Mining Company.—Seventy-five men are employed on repair work. The old 4-drill compressor has been replaced by a 10-drill Rand cross-compound. The vein is 7 ft. wide. Other veins formerly encountered are also being opened up. A new power-house 25 by 65 ft. has just been completed near Silverton.

Henrietta.—The towers of the new tramway are completed and the cable and buckets are being put up.

Highland Mary—The new 1,000-ft. pipe line has been completed and the mill near Silverton is again running at full capacity.

Isolde.—This Silverton property is again shipping some rich ore in small lots, direct to the refinery in Denver.

Mazeppa Group.—David Heindle, of Silverton, has found an 18-in. streak of silver-lead ore in the lower tunnel 180 ft. from surface.

Ruby Basin Mining and Tunnel Company.—A new mill is to be erected, the process depending on the result of the test of a 10-ton lot recently sent to Denver.

Shenandoah No. 3.—The output has increased to 6 cars per month of ore ranging from $175 to $200 per ton. New buildings are being erected for work all winter.

Unity Tunnel.—The force numbers 150 men and is employed on development at the Round Mountain, Nevada, and other properties of the Unity group, near Silverton. A new boarding house is just completed and a tramway is to be built from the lower tunnel in the early spring. The new tunnel in 140 ft. is being driven by two Ingersoll drills.

Venetian Mining Company.—This company has

stopped work at the Peacock claim on Cement creek, near Silverton, ostensibly for repairs.

IDAHO.

BOISE COUNTY.

Gold Coin Mining Company.—This company, of Idaho City, will soon equip its mine with a hoisting plant and a 60-ton quartz mill. An electric power plant will be added next year.

IDAHO COUNTY.

Ajax.—The Concord company has erected a shaft house on this property, and is ready for deep work.

Moonlight.—D. Mackenzie has purchased this group of three claims, in Thunder Mountain district, from E. W. Heath, of Warren, the consideration being $20,000.

Mother Lode.—This claim is being developed by a tunnel from Ruby lake. Louis Smith is in charge.

KOOTENAI COUNTY.

Idaho Mining Company.—W. H. Plummer & Co. have purchased the controlling interest in the Idaho Mining Company, which owned five claims near Bonners Ferry, about a mile from the railroad. The purchase price is said to be about $25,000 for the entire property. The new owners have incorporated the Idaho Gem Mining and Smelting Company, to take over the property.

Little North Fork Mining and Milling Company.—This company, recently incorporated, had a small force of men working all summer, and is to push work the entire winter with two shifts. There are six claims in the group. A tunnel is being driven on one, and is into the mountain 200 ft. The owners are mostly Wardner men. F. P. Matchette is president; B. Peckham, vice-president; G. W. Harris, secretary; T. R. Mason, treasurer. The directors are: J. Brandon, P. Anderson, T. R. Mason, B. Peckham and F. P. Matchette. H. L. Alward is superintendent.

NEZ PERCES COUNTY.

Hogan.—The mill on this property is shut down, and will not start again until superintendent Acres makes his report to the Daly Trust Company, at Butte, which has a bond on the mine, and which has just completed a mill test of the ore. The bond was taken in September.

SHOSHONE COUNTY.

Snowstorm Copper Mining Company.—This property is located 3½ miles north of Mullan. A strike of rich copper ore was reported recently in running a 1,600-ft. crosscut tunnel, which intersected the 30-ft. ledge about 1,000 ft. below the surface outcrop and 500 ft. beneath tunnel No. 2.

ILLINOIS.

SANGAMON COUNTY.

(From Our Special Correspondent.)

The Executive Board of the Illinois Coal Operators' Association held a joint convention with the National Brotherhood of Coal Hoisting Engineers at Peoria on October 8, for the purpose of making a scale and agreement for the year ending November 1, 1904. The engineers demanded a flat advance of $20 per month for all engineers at mines of all classes, which would be an advance ranging from 25 to 33 1-3 per cent. The operators offered 12½ per cent advance, which they considered fair and even liberal, as Illinois engineers already get higher wages than engineers at the mines in any other State where they work the same hours, while the prices in other States included advances last spring of about 12½ per cent. The convention adjourned without reaching an agreement.

On Tuesday, October 5, attorney Folsom, of Chicago, representing the Illinois Coal Operators' Association, met State's Attorney Shutt, of Springfield, and some of the operators, for the purpose of arranging a case to test the constitutionality of the law enacted by the last session of the Legislature, compelling operators of mines to provide and maintain wash houses.

Cora Coal Company.—This company, recently incorporated, to sink a mine at Cora, on the Chicago, Peoria & St. Louis Railway, is at a standstill because it cannot at present get a clear title to the coal right, and will do nothing before spring.

Staunton Coal Company.—This company, recently incorporated, is to open a large mine at Staunton, on the Litchfield branch of the Chicago, Peoria & St. Louis Railway. James Duncan, of Alton, with other officials of the road, is interested.

INDIANA.

GREEN COUNTY.

(From Our Special Correspondent.)

The population of Jasonville in 1900 was less than 100, but is now fully 2,000. There are already 13 coal shafts within a radius of 3 miles of the town. These mines employ several thousand men, and their aggregate capacity is more than 6,000 tons a day.

SULLIVAN COUNTY.

(From Our Special Correspondent.)

Union Coal Company.—This company, composed of Anderson men and others, is rushing work on its new mines. The first shaft is down 90 ft. The Terre Haute & Evansville Railroad is building a spur to the mines.

KANSAS.

ATCHISON COUNTY.

Atchison Coal Mining Company.—The shaft of this company, at Atchison, is down 900 ft., and is to be sunk to 1,187 ft. Two veins of coal were struck, one 22 in. and the other 36 in. thick. The company is capitalized at $100,000, of which $60,000 is paid in. The officers are: President, F. M. Baker; treasurer, J. C. Fox; secretary, W. R. Collett. Among the directors are: E. W. Howe, William Carlyle, of the Carlye-Pennell Lumber Company, and George Storch.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—This mine produced 345½ tons of mineral in September, the largest month's output in its history. Rock shipments were reduced 10 per cent, but the yield increased to 20 lbs. a ton.

Baltic.—The September production was 674 tons of mineral.

Calumet & Hecla.—The output in September was approximately 3,200 tons of refined copper.

Champion.—The output in September was 734 tons of mineral. Seven cars containing parts of the new 100-drill air compressors have been received from the Nordenberg Manufacturing Company, of Milwaukee, Wis. The remaining parts will arrive shortly. Men are installing the machine. R. J. Corbett is in charge.

Copper Range Consolidated.—This company, which owns the Baltic and Trimountain mines and one-half the Champion, made 1,150 tons of refined copper last month.

Franklin.—The production in September was 341 tons of mineral. Sinking in the new No. 2 shaft, at the Junior branch, has reached a depth of 80 ft. The openings south from No. 1 shaft continue in good ground.

Isle Royale Consolidated.—Diamond drill explorations on section 2, are retarded by the heavy overburden. Nothing of importance has been revealed but a complete record of the geological formation is being secured.

Quincy.—The September output was 1,005½ tons mineral.

St. Mary's Mineral Land Company.—The two diamond drills, one next to the Globe and the other south of the Winona mine, are still in commission.

Tamarack-Osceola Copper Manufacturing Company.—Operations at the copper sheet rolling mill at Dollar Bay will be resumed this month. The mill has a capacity of 25,000 lb. of sheet copper daily and will employ 55 men.

Trimountain.—No. 4 shaft is shipping rock to the mill. It is 525 ft. deep. Work on the new steel shaft and rock house is practically completed. Work on the new hoists at Nos. 2 and 3 shafts is well advanced. The stamp mill is treating about 1,900 tons of rock daily, and little change in production is likely for several months.

Winona.—The September product was 40 tons of mineral. Opening work in No. 3 shaft is advancing rapidly.

Wolverine.—This mine made 522 tons of mineral in September. There has been trouble at the pumping station at the mouth of the Tobacco river, floating bark clogging the intake. Grates are being placed around the intake.

Wyandot.—Operations are confined to the vertical exploratory shaft.

IRON—MENOMINEE RANGE.

Fogarty.—George J. Mass and Frank A. Bell, of Negaunee; Alois Dober, of Iron River, and Paul Schook, of Crystal Falls, have secured a 50-year lease on this property. An ore body has been found by means of drills.

Hiawatha.—The management of this mine at Iron River, has closed a contract with the Kinnickinnic Furnace Company, as a result of which all-rail shipments of ore will be made from mine to furnace until next April. The contract calls for 200 tons daily.

Tobin.—This mine at Crystal Falls has cleaned up its stock of surplus ore and increased its room for ore on the surface. The shaft is to be sunk another level, and the system changed from underhand to back stoping.

KEWEENAW COUNTY.

(From Our Special Correspondent.)

Arnold.—The steel rails, 300 tons, on the Arnold & Eagle Harbor Railroad, a narrow gauge line, 2 miles long, running from the mine to the mill, have been sold to the Lake Superior Iron and Metal Company, of Hancock, Mich. Ten 25-ton rock cars have been purchased by the Quincy Mining Company.

Mohawk.—This mine produced 367 tons of mineral in September. A contract for permanent hoists, duplicates of the one installing at No. 4 shaft, for Nos. 2 and 3 shafts, has been let to the Nordberg Manufacturing Company, of Milwaukee, Wis. No. 4 shaft has reached the seventh level. Pending the completion of the new steel rock and shaft house, sinking has been suspended. Work on the third head at the mill is well advanced.

Phoenix Consolidated.—The one-head mill on Eagle river, one mile from the mine, has gone into commission. Rock shipments average 150 tons daily and are coming from the stock piles. The west vein shaft is down to the ninth level, 800 ft. Stopes are opening from the fourth to the ninth levels. The St. Clair shaft is producing considerable mass and barrel copper.

ONTONAGON COUNTY.

(From Our Special Correspondent.)

Mass Consolidated.—This mine is yielding a large quantity of barrel and mass copper. Development work is progressing steadily. Rock shipments average 350 tons daily. The rock is closely selected.

Michigan.—The new frame rock and shaft houses at A and B shafts are each 40 ft. by 56 ft. The structures are practically completed, and rock shipments to the Mass mill at Keweenaw Bay will begin shortly.

Victoria.—No. 2 shaft has reached the 20th level. Sinking continues. Work on the hydraulic power plant is well advanced.

MINNESOTA.

(From Our Special Correspondent.)

Iron or shipments from Minnesota for September were 1,842,847 tons, a decrease of 308,000 from September, 1902. The State is still 265,000 tons ahead of last year to this date. Other ranges are far behind last year. The Sault canals reported shipments for September of 2,468,000 tons, and for the year to October of 15,844,000. These compare with 2,902,000 and 16,545,000 for the corresponding periods last year.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

In sections 5 and 6, T.-58, R.-15, several parties continue at work, but without any great measure of success, so far in 6. E. J. Longyear is doing contract drilling, while in 5 McGowan is drilling.

In the southwest of the southwest of section 21, T. 59, R. 14, where E. J. Longyear has been drilling for nearly a year, about 1,000,000 tons of very nice ore have been discovered. It is bessemer, and lies near the surface. Negotiations for sale are said to be on.

Where D. T. Adams and others have been working for several months in section 15, T. 59, R. 14, they have not such encouraging indications now as earlier. They have not shown up any large body of clean ore yet, but of 20 pits half are in splendid ore to the depth of from 10 to 50 ft. Mixed ore 57 ft. thick has been cut with the drill. Operations are still under way. The ore so far found lies close to the surface.

Ore is said to have been found on the shores of Crooked lake, in section 25, T. 58, R. 17, southeast of the generally accepted line of ore bearing formation. What ore is found has been below the lake's level.

Exploration by Longyear & Hartley on State lands, in sections 10, 11 and 12, T. 58, R. 19, have ceased. Some low-grade ore was found, but not in paying quantities.

Arcturus.—This mine, in section 13, T. 50, R. 24, is now stockpiling ore. The washing plant has been tested and found practicable.

Holland.—This is the name of the mine of Swallow, Hopkins & Holland, in section 4, T. 58, R. 16, west of the Biwabik and Duluth mines. The owners have about 100 men stripping, and propose to maintain this force all winter, stripping by hand. They have bought an outfit of 1-yd. cars and will have a short haul for the waste.

International Harvester Company.—The Hawkins mine, at Nashwauk, will ship this year about 125,000 tons, and the Agnew about 100,000 tons. Both are in shape to produce heavily another year.

Minnesota Iron Company.—This company, which has been exploring lands belonging to Spellman & Daniels in section 6, T.-58, R.-15, has dropped the option. This land has now been explored four or five

times. The Minnesota Iron Company found about 750,000 tons of excellent ore, high in iron and low in phosphorus, and as hard as any ore mined in the Lake region. But the surface is 200 ft. thick, and the ore adjoins a lake, with sand between it and the water.

Monroe.—Stripping has been started by the Killorin-Philbin Company, who have taken the entire contract of 2,000,000 yds. They have one machine on the ground and will have another in a short time. The Minnesota Iron Company is erecting dwellings and shops and clearing land. This new mine cannot ship before 1905, for there is much stripping to be done, with three shafts to sink.

Morris.—This mine of the Minnesota Iron Company, which is being stripped by the Drake & Stratton Company, was to have made its first shipments this fall.

Stephenson.—This mine's area has been added to by a deal with the Great Northern road, and Messrs. Bennett & Longyear, who own the title to land north of the open pit. The mine includes two more 40's. The remaining houses will be moved, and the road will bend around the entire location, a quarter mile to the north. The east end, or mouth, of the pit is being widened by steam shovels in stripping, and a large area of ore is being uncovered. The mine is nearly through its shipments for this year. Considerable development will go on during the winter.

Stevens.—This mine will erect a lot of dwellings for employees during the winter. It is not shipping as heavily as was expected.

IRON—VERMILION RANGE.

(*From Our Special Correspondent.*)

There will be no decrease at any of the Chandler group, except possibly at Pioneer. The development work in progress there is to be continued steadily. At the Soudan mine only firemen and pumpmen are busy.

Three drills are now working on section 30, T. 63, R. 11. There are now no drill crews operating east of Ely except these on section 30.

One drill is operating on the McComber land, in section 14, T. 62, R. 14. One hole was sunk 1,000 ft. without favorable result, and another at a steeper angle, is down some 700 ft., but has met nothing more favorable than jasper and thin bands of magnetite. If this hole is barren, the Mahoning Ore and Steel Company will probably abandon the property.

MONTANA.

BEAVERHEAD COUNTY.

Copper Queen.—J. H. Burnett, operating this mine, on the Montana-Idaho line, owned by George D. Lynch, of Dillon, made a shipment, said to have returned $14 gold, 30 per cent copper and 30 oz. silver to the ton.

FERGUS COUNTY.

Abbey.—A rich strike of galena is reported in this mine. A ledge 5 ft. wide was struck 200 ft. down an incline shaft.

JEFFERSON COUNTY.

Minnesota.—This mine near Wickes has been bonded by O. M. Holmes. A new shaft will be sunk and a tunnel driven at the foot of the mountain.

LEWIS & CLARKE COUNTY.

Standard Ore Company.—This company of Helena, which has secured the Jay Gould mine near Marysville, is re-opening it and will erect a 20-stamp mill.

MISSOULA COUNTY.

Dannamora.—Work has begun on a crosscut tunnel at this mine, near Borax, owned by the Dannamora Gold-Copper Mining Company. The lead will be tapped at a depth of about 1,000 ft. below the apex. Oscar Nordquist is president.

PARK COUNTY.

Kimberly Gold Mining Company.—At this property near Jardine instructions have been given to place the new 40-stamp mill in operation at once. This will give the company 80 stamps. The cyanide plant will be in charge of C. L. Weed, of Salt Lake City.

Kimberly-Montana Gold Mining Company.—The power plant being installed on Bear creek by this company, it is reported, will be ready about November 1. As soon as the final details of the transfer of the property of the Bear Gulch Mining Company to the Kimberly-Montana Company are settled, work will be pushed.

SILVER BOW COUNTY.

Betsy Dahl.—At this mine, owned by the Reins Copper Company, a station is down 1,300 ft. The company is putting in a new pump at the 400-ft. level.

NEVADA.

LINCOLN COUNTY.

(*From Our Special Correspondent.*)

Newport & Nevada Mill.—This new plant, near Fay, is in commission, handling 40 tons per day. General manager Edward Parrish, of Newport, R. I., is on the ground.

WASHOE COUNTY.

Ideal Gold Mining and Milling Company.—This company, of Reno, is to equip its Donnelly mountain mines with a milling plant expected to be in commission by spring.

NEW MEXICO.

GRANT COUNTY.

National Gold and Silver Mining Company.—The 50-ton mill has arrived, and is being erected under the supervision of B. L. Berkey. The property is near Stein's pass.

OREGON.

BAKER COUNTY.

Alpine.—The sawmill on this property is preparing lumber for the 20-stamp mill, the machinery for which has arrived. John T. Grayson is manager.

Baby McKee.—The air compressor has been started, to continue work on the main tunnel, which is now in 1,800 ft. This tunnel opened up five or six ledges, and is said to expose some high-grade ores. A reduction plant may be erected next spring.

California.—This mine has been shut down temporarily, to handle the large amount of ore being mined.

Imperial.—This mine has been under lease to Bourne & Nibley, who have applied for a patent. The granting of this patent is to be contested by several parties, among them the Last Chance people. When the Imperial ground was first surveyed it was found that the locators had failed to take in a piece of ground lying between the Imperial and another claim. This destroyed title to the first named, with the result that it was jumped by different parties, and the probabilities are that the matter will have to be settled by the courts.

SOUTH DAKOTA.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

Gladiator Consolidated Gold Mines and Milling Company.—The main shaft at the Gold Fish is 50 ft. deep.

Gold Standard Group.—Perry Bertchy and Dennis Henault have the contract for sinking a shaft 100 ft. deep. They are now down 80 ft. George Phillips is superintendent.

North Star Mining Company.—The 10 stamp mill has been started after a year's idleness. Concentrating machinery is to be installed later.

Wabash Mining Company.—A discovery of rich ore is reported on the ground 8 miles west of Custer by C. S. Johnson.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Dakota Mining and Milling Company.—T. J. Steele, of Sioux City, has an option on the control of the stock, and announces that it will pass into his possession. He expects to enlarge the cyanide plant at Deadwood to twice its present capacity.

Lexington Hill Gold Mining Company.—The 20-stamp cyanide plant is treating upward of 100 tons per day. Some of the ore carries free gold.

Little Mowee.—Aaron Dunn, owner, is taking out 100 tons of ore for trial shipment to the National smelter at Rapid City.

Spearfish Gold Mining and Reduction Company.—The last preferred dividend has been declared, and the announcement is now made that November 1 a dividend of ½ per cent will be paid on all outstanding stock. Two tanks will be added to the cyanide plant.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Burlington Gold Mining Company.—The shaft is 60 ft. deep.

Cochran.—James Cochran, original owner, has regained possession and has driven cross-cuts east and west from the bottom of the shaft, where work was abandoned by the company that held the ground under option for a year.

Ohio-Deadwood Gold Mining Company.—A Huntington mill of 100-tons capacity is being erected on the ground at a cost of $10,000.

Sunbeam Gold Mining Company.—The shaft in Friday gulch is 300 ft. deep and drifting from the bottom is in progress. A 10-stamp mill is nearing completion.

TEXAS.

Coal Miners' Wages.—The Thurber Company, the Rock Creek Company, and the Strawn Company have settled the strike of the coal miners by advancing wages, granting eight hours, semi-monthly pay days and the employment of weighmen. The agreement provides for the employment of either union or non-union labor.

The following prices are to be paid for mining on the screened coal basis: At Thurber, from October 1, 1903, to January 31, 1904, $1.15 a ton; February 1 to August 31, 1904, $1.17½ (former price was $1.) At Rock Creek, 2½c. a ton more than at Thurber; the price at Rock Creek was $1.05. At Strawn, October 1, 1903, to August 31, 1904, $1.25, an advance of 15c. a ton. At Bridgeport, same period, $1.40 a ton, an advance of 15c. There are advances in the scale for driving entries, etc., and in the wages of all other employes than miners. A scale is also provided for machine mining.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Shipments.—The ore and bullion settlements reported by Salt Lake banks during the week ending October 9 were: Crude ores and concentrates, $219,100; base bullion, $211,600; gold bars, $6,400. Total, $437,100.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Horn Silver.—At the annual stockholders' meeting in Salt Lake on October 6 directors were chosen, who organized, with A. C. Washington, president; J. M. Cebellos, vice-president; Ambrose I. Harrison, secretary and treasurer, all of New York; P. T. Farnsworth, general manager; James Sharp and John Sharp, of Salt Lake, directors. M. C. Morris, of Salt Lake, was chosen assistant secretary. The company has a surplus of about $85,000. Since January 1, 5,986,000 lbs. of crude and 3,000,000 lb. of concentrated have been marketed.

Imperial Copper Company.—The main tunnel is in ore, the vein thus far showing a width of 90 ft.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Ore Shipments.—For the week ending October 9 shipments were 112 cars, as follows: Bullion-Beck, 3; Carisa, 1; Centennial-Eureka, 40; Eagle and Blue Bell, 2; Gemini, 7; Grand Central, 19; Lower Mammoth, 1; Martha Washington, 1; Richmond-Anaconda, 1; Rabbit Foot, 1; Star Consolidated, 5; South Swansea, 5; Tetro, 4; Uncle Sam Consolidated, 1; Victor Consolidated, 2; United Sunbeam, 2; Yankee Consolidated, 6; Black Jack, 2; Dragon Iron, 11.

Bullion Beck.—A fire which started mysteriously somewhere in the old stopes of the Bullion-Beck or Eureka-Hill mines has resulted in filling the workings of these mines and also of the Centennial-Eureka and Gemini with dense smoke. An unsuccessful effort has been made to locate the fire and the managers have decided to seal the surface openings in hopes of smothering it. In the Centennial-Eureka, foreman Menlove was suffocated while attempting to put in a bulkhead. The ore output of the Tintic district will be materially reduced this month, the mines affected being among the heaviest shippers.

May Day.—The jigging plant is closed on account of a scarcity of water. A special meeting of the stockholders will be held on October 24 to fill two vacancies in the board of directors.

Star Consolidated.—Fifty-nine tons of ore marketed this week netted $83, the product carrying gold values of 4.83 oz. The ore shoot has been proven from the 300 to the 500-ft. level.

Swansea.—This mine has resumed work after being closed for about a year. The management has contracted to deliver a car of fluxing ores per day to the Majestic Copper Company's smelter at Milford.

Tetro.—Two cars of ore marketed during the week brought almost $1,500.

PIUTE COUNTY.

(*From Our Special Correspondent.*)

Sevier Consolidated.—This company's new mill is in commission, treating 25 tons of ore per day, which runs from $10 to $20 per ton.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated Smelter.—The copper bullion shipments during the week ending October 9 aggregated four cars, 241,567 lb.

Boston Consolidated.—Shipments of ore amounting to 40 tons daily go to the United States smelter at Bingham Junction, as an accommodation to the smelter management, which has had its supply of ores from the Centennial-Eureka mine cut on account of the fire in the Tintic mines. Upon the completion of the Bingham Copper Belt Railway to the mine, the

delivery of 300 tons per day to the Bingham Consolidated smelter will begin.

Columbia Copper Company.—This company has purchased the Dewey concentrator at Bingham, which will be operated pending the building of a plant capable of treating a larger tonnage.

Columbus Consolidated.—This company is marketing ores from its recent strike, which net almost $80 to the ton. Work is pushed on the construction of a new electric power house.

United States Smelter.—Copper bullion shipped during the week ending October 8 amounted to three cars, 181,706 lb.

Utah Consolidated Smelter.—The plans for enlargement are in the hands of the executive officers in New York. It is expected contracts will be let for construction before the end of October. The production of copper bullion during the week ending October 8 was five cars, 301,465 lb.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Consolidated Mercur.—This company's mill is in commission. Manager George H. Dern says the Moore slimes plant is a complete success. The equipment is handling about twice the tonnage expected, and half the plant will treat the daily output, while half will probably treat tailings dumps.

UINTAH COUNTY.

Summit Placer Mining Company.—This company, operating at Soldiers' Summit, on the line of the Rio Grande Western, is at present producing about one ton of ozokerite, or mineral wax, daily. S. L. Butler is manager. T. P. Rigney is superintendent.

WASHINGTON.

FERRY COUNTY.

(*From Our Special Correspondent.*)

Republic Ore Shipments.—During August 102 cars were shipped, aggregating 3,430 tons, valued at $48,020. September shipments amounted to 6,440 tons, valued at $90,160. The shipments for the week ending September 3 to the Hall mines smelter were, from the Nob Hill mine, 2 cars; Zala M., 2 cars, and Mountain Lion, 35 cars. To the Tacoma smelter, from the Quilp, 12 cars.

Blue Horse Group.—This property, on Iron mountain, 12 miles east of Republic, has a 5-ft. quartz vein. It has a 97-ft. shaft and 85 ft. of drifts. About 100 tons of ore on the dump runs about $30 per ton in gold and silver, with a small percentage of lead.

Faithful Surprise.—The Surprise tunnel is in 247 ft.

Eureka District Gold Mining Company.—This company has paid $5,400 into the Eureka county treasury, in compromise settlement of taxes, etc., due for 1900, 1901 and 1902.

Golden Eagle.—The shaft is down 107 ft. The machinery is working satisfactorily.

Lone Pine-Surprise.—Two men are employed under lease exploring the No. 4 Lone Pine vein.

Morning Glory.—The shaft is down 300 ft. below the adit level, and a crosscut has been started for the vein.

Mountain Lion.—The machinery has been overhauled to run the air compressor. The power drills are being put in shape to begin stoping. Ore is shipped at the rate of 1,000 tons per week. It is reported that the mill will be altered to use the Hendricks process.

Zala M.—The installation of machinery is completed. The company has decided on sinking from the 300 to the 400-ft. level and drifting. The ore being stoped on and above the 300-ft. level is piled on the dumps, the bins being full and haulage suspended on account of bad roads.

WYOMING.

FREMONT COUNTY.

George McKay.—This mine has been sold to Salt Lake City men, who will install a plant to treat the ore.

Wyoming Central Gold Mining and Milling Company.—On the Strawberry group, at Lewiston, owned by this company, a 2-compartment shaft is down 50 ft., and a gasoline hoist and pump is to be installed this fall. The company is also preparing a plant for the treatment of its own ore and also to do custom work.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—Shipments for the week ending September 26 were as follows: Granby mines to Granby smelter, 8,194 tons; Snowshoe mine to Sunset smelter, 2,880 tons; Mother Lode to Greenwood smelter, 2,840 tons; Sunset to Sunset smelter, 288 tons; Morrison to Greenwood smelter, 190 tons; Emma to Nelson smelter, 297 tons; Oro Denoro mine to Sunset smelter, 583 tons; Winnipeg to Sunset smelter, 375 tons; Athelstan to Sunset smelter, 180 tons; total for the week, 16,854 tons; total for year to date, 447,660 tons. For the week ending October 3, were: Granby 8,803; Mother Lode, 2,912; Snowshoe, 2,370; Sunset, 288; Emma, 231; Oro Denoro, 594; Morrison, 240; Athelstan, 270; Winnipeg, 450. Total for the week, 16,158 tons; year to date 465,655 tons.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—Shipments for the week ending September 26 were: Le Roi, 5,760 tons; Centre Star, 1,440; War Eagle, 1,170; Le Roi No. 2, 760; Jumbo, 200; Spitzee, 30; I. X. L. (milled), 200; total, 9,560. Year to date, 286,958 tons. For week ending October 3 were as follows: Le Roi, 5,790; Centre Star, 1,170; War Eagle, 870; Le Roi No. 2, 480; Jumbo, 168; I. X. L. (milled), 200. Total for the week, 8,678 tons; year to date, 295,636 tons.

MEXICO.

CHIHUAHUA.

(*From Our Special Correspondent.*)

Cigarrero.—This mine, in the Almoloya mountains, has a cross-cut in 70 metres at the 300-ft. level, opening a body of lead carbonate ore, showing 32 per cent lead, 16 oz. silver and 4 oz. gold to the ton. The company is shipping 75 tons per day, the ore being packed out of the mine by peons, who are paid $5 Mexican per day, some peons packing loads as high as 170 kgs. The face of the cross-cut is all in ore, no walls having been found. The property could have been bought two years ago for $6,000 Mexican. It was taken by six Mexicans, who capitalized it for $30,000 Mexican, and happened to strike this ore. They are now paying dividends of $25,000 monthly. The Guggenheims are reported making overtures to secure the property, as it is considered a greater strike than the Palmillo. The mine is 20 miles west of Jimenez, and 3 miles south of Troya station, on the Mexican Central Railroad.

Encinilles Mines, Limited.—This company has its new smelter at Santa Rosalia, consisting of a 50-ton matte furnace, and a 50-ton lead furnace under construction by the Allis-Chalmers Company. The plant will be ready to blow in about November 12. The foundations for a 200-ton stack have been laid.

Hidalgo Mining Company.—It is reported that the properties of this company, and of the Parral & Durango Railroad will change hands on January 1, 1904.

La Luz.—The 16-ton Merralls mill has arrived at Minaca, and will be packed to the mine at Magnarichic. It will be installed at once and run by water power. The lixiviation plant will be put in later. The company is composed principally of Louisville, Ky., people, with headquarters in that city.

Panuco.—First payment on the purchase price of this copper mine has been made through the First National Bank of Denver, the buyers being Hugh McDonald, of San Francisco, and N. F. Cleary, of New York City, and the vendor a London company.

Torreon Smelter.—The owners have purchased the San Diego mine at Santa Barbara, which is now under development for them by Col. J. W. Pender, of Chihuahua.

MINING STOCKS.

(Full quotations are given on pages 606 and 607.)

New York, Oct. 14.

Another week of heavy liquidation and record low prices has put the stock market in a disheartening condition. Hope for an early recovery is remote, as the leading securities, which usually initiate an improvement, are in such a plight as to nonplus the public. This seems a time to make comparisons between the high prices that ruled in June, 1901, and later, and the low records established in the current month. In selecting the following 11 companies to illustrate the magnitude of the recent liquidation, they have been considered leaders among the shares representing capital invested in the mineral and kindred industries.

	High.	Low.	Total depreciation.	
Amalgamated	$130.00	$33.88	$96.12	$148,993,750
Anaconda	51.38	15.50	35.88	18,600,000
British Columbia	18.50	2.25	16.25	6,500,000
Greene Con.	31.38	14.00	17.38	12,513,600
United, com., Mont.	36.38	9.00	27.38	20,535,000
White Knob, Idaho	27.25	9.00	18.25	3,650,000
Am. Agri. Chem., com.	30.00	11.00	19.00	3,800,000
Am. Agri. Chem., pref.	90.00	69.00	21.00	4,200,000
Am. Sm. & Ref., com.	59.88	39.13	20.75	10,375,000
Am. Sm. & Ref., pref.	105.00	84.50	20.50	10,250,000
Standard Oil	842 00	620.00	222.00	216,450,000
U. S. Steel, com.	52.38	12.50	39.98	219,340,000
U. S. Steel, pref.	100.38	57.25	43.13	237,215,000
Va.-Car. Chem., com.	68.00	17.50	50.50	19,190,000
Va.-Car. Chem., pref.	121.00	86.00	35.00	4,200,000

In the aggregate the depreciation in the market value of these shares totals $935,812,350 in a period of less than 2½ years, and the combinations have been the heaviest losers. United States Steel common stock has fallen over 76 per cent, and the preferred 43 per cent; Virginia-Carolina Chemical common, 74 per cent, and preferred about 29 per cent; Amalgamated Copper, 74 per cent, and Heinze's United common 75 per cent. The six copper stocks named show a total depreciation of $249,532,350 of which Amalgamated alone recorded over 61 per cent.

In the past week Amalgamated showed large sales at a discount of 4⅞ points, which established the low record of $33⅞. This price, by the way, gives the company's entire holdings a market value of less than the selling basis of Boston & Montana prior to its absorption. Speculation is rife as to whether Amalgamated will follow the policy of the United States Steel directors when considering its quarterly dividend next month. Anaconda has been sympathetically weak, selling down from $17.34 to $15.50, the lowest price yet made.

On curb, Greene Consolidated attracted attention, as it was pressed for sale and broke from $17.12½ to $14. Doubtless the stock has been adversely influenced by the talk that no further dividends will be paid until developments warrant, as the company intends to open up the property on better business principles. Tennessee is the only stock in the copper list which does not suffer from the general depression; it is held for investment, not speculation, and the few sales made are on a basis of $28. White Knob, of Idaho, gained to $10.50 on the strength of completing its smelting facilities. British Columbia is dormant.

In the gold and silver group there is a better feeling. Ontario, of Utah, appeared at $5.50, and Daly at $1.90. Portland, of Cripple Creek, which pays a 3c. quarterly dividend this week, rose from $1.15 to $1.25. More assessments in the Comstock section have reduced prices. Best & Belcher, with 10c. just levied, weakened from $1.50 to $1.30. Consolidated California & Virginia lost 10c. to $1.25, and Ophir the same amount to $1.50, while Hale & Norcross brought 52c., and Potosi 23c.

In the industrial list United States Steel common made its low record on October 12 at $12.59, and the preferred $57.25. It would seem that the bottom had nearly been reached.

Boston. Oct. 13.

(*From Our Special Correspondent.*)

It has been a dull and uninteresting week in this market, and again Amalgamated Copper and Copper Range Consolidated have monopolized the attention. As goes Amalgamated so goes the market, at least, the copper share end of it. Whereas Copper Range was about $10 above Amalgamated a week ago, the difference is now about $8. Indications point to the fact that interests in this city have been accumulating Amalgamated for some time, even though the stock has made a new low record at $34.75 here. Copper Range has fallen $6.50 during the week to $44.50, closing a fraction above this. Almost 94,000 shares of Trimountain stock have been turned in for exchange for Copper Range, and in all probability all but about 3,000 shares will eventually be exchanged.

Mohawk has been soft, selling off $3.75 to $35.50. Osceola has fluctuated from $53 to $51, and Tamarack sold at $76@$75. Quincy sold at $88@$85. Wolverine holds close to $63. Old Dominion broke to $5, which is its lowest price. Stockholders have authorized the directors to carry out the plan as outlined by them some time since. Centennial fell $2. to $14.25, but recovered to $15. Parrot sold at $17.75 to-day, although very few trades are reported in this stock. Utah settled $1.50 to $24, with a 50c. recovery. This company has voted to spend $250,000 on its smelter, which will increase its capacity 40 per cent. United States has been soft, declining almost $1 to $16.62½, with partial recovery. The latter has met with disappointment in the tramway recently built. September net earnings were about $100,000.

Dominion Iron and Steel sold down $3.62½ to $7, with no support apparent. Dominion Coal is off $9.50 from a week ago at $60.50, although it touched $59.50 to-day on what appeared to be Canadian selling.

The annual report of the Trinity Copper Company gives expenses of $47,453 for the year ended September 30; but does not tell the financial condition of the company. President Lawson states that owing to the unsettled conditions nothing has been done about the erection of a smelting plant.

Adventure touched $3 during the week; Allouez, $4; Atlantic, $7; Bingham, $21; Elm River, $2.12½; Isle Royale, $5.50; Mass., $4.12½; Michigan, $6; Phoenix, $4.50; Shannon, $9; Trinity, $5.12½; Victoria, $2.87½, and Winona, $6. Calumet & Hecla is quiet at $430@$435.

Colorado Springs. Oct. 9.

(*From Our Special Correspondent.*)

The market this week has been featureless, prices remaining practically stationary or declining. The miners' strike in the Cripple Creek district is still in effect, and to this can be attributed the inactivity of mining securities. The drainage tunnel is doing its

work well, as the water level in a number of the big producers is being gradually lowered.

Cripple Creek Consolidated changed hands during the week at 4c. C. K. & N. sold at 18½c. a week ago, advanced to 20c. and closed the week at 19c. bid. Doctor-Jack Pot sold from 9c. a week ago to 8¾c. Elkton's bid price declined from 47½c. last week to 45½c. to-day. El Paso followed the same example, selling from 60½c. down to 50c., with no apparent good reason. Findley was traded in extensively at 14¼c. Gold Dollar Consolidated sold down to 4c. Isabella was stationary at 11c., selling at that figure all week. Mollie Gibson continues to advance, the quotation changing from 6½c. bid last week to 8c. to-day, no stock coming out at the higher figure. Moon Anchor sold from 11½c. to 12c. during the week. For Portland $1.10 was bid, no stock changing hands at this low quotation. Golden Cycle showed some activity at 65c. Among the prospects Mary Cashen was active, selling at 2c. and 2½c.

Salt Lake City. Oct. 10.

(From Our Special Correspondent.)

The sales of mining stocks this week were 227,493 shares, which brought $66,471.44. Consolidated Mercur is considerably stronger, 12,200 shares being transferred. The Moore slimes plant is now in operation, and the management announced it is proving a success. The directors of the Daly-West declared another dividend of 65c. a share, $117,000, and Utah $1,000, or 1c. a share. Swansea rose in price on the strength of the contract made with the Majestic Copper Company for at least 25 tons per day of its argentiferous iron ores. Star Consolidated jumped a few points. Tetro closed weaker. Park City stocks have been in light demand, and nearly all show shrinkages.

San Francisco. Oct. 10.

(From Our Special Correspondent.)

On the old Exchange comparatively little business was done, and most of the trading was by insiders or by chippers working for small profits. No support was given to prices, and the result was considerable weakness. Some quotations noted are: Ophir, $1.60@$1.65; Consolidated California & Virginia, $1.35@$1.40; Mexican, $1.10; Hale & Norcross, 58@60c.; Potosi, 25@26c.; Savage, 25@26c.; Gould & Curry, 24c.; Crown Point, 20c.

On the San Francisco & Tonopah Exchange business was quite active, with considerable trading reported. Tonopah, of Nevada, sold at $7.75; Tonopah Belmont, $1.25@$1.30; Montana Tonopah, 95c., and Pine Grove, 75c. There was also quite a strong demand for the minor stocks at improved prices. Wild Goose, of Alaska, was quoted at $2.50 bid and $2.90 asked.

In oil shares business was quiet, and prices rather easy. Several new stocks have made their appearance, but do not seem to call out much demand. Home sold at $1.05@$1.15; Four Oil, 69c.; Oil City, 29c.; Chicago Crude, 21c. At the close, however, there was a slight revival in business.

COAL TRADE REVIEW.

NEW YORK, Oct. 14.

ANTHRACITE.

The anthracite market continues quiet, and there is no prospect of any great improvement in demand until cold weather comes. The week's heavy rains did some damage at the mines, and more to the main lines of some of the anthracite roads; but the temporary shortages in car supply and delay in transportation had little effect on the market. The collieries are still running on short time, or are shut down for repairs, or for other reasons, and the output for October will undoubtedly be less than that for September, which was 4,654,444, compared with 5,169,402 tons in August, the total output for nine months being 47,086,293 tons.

In the northwest the market is quiet. The demands from country yards has been light of late, and consumers in the cities, except those who always wait till cold weather, have ample supplies. Supplies on docks at the head of the Lakes are very heavy, and receipts are beginning to fall off. In Chicago territory stocks in shippers' hands are fairly large, and the various sizes are so well distributed that purchasers have no trouble in getting any size wanted. Retail demand is improving slightly. Receipts by Lake are still heavy, as are those by all-rail, and there is no likelihood of any shortage this winter. Among the lower lakes and in Canadian territory trade shows little change. Most dealers are now well supplied, though a few may lack a sufficient supply of certain sizes. Along the Atlantic seaboard conditions are unchanged. The heavy storms late last week and early this week did some damage to shipping, and interfered with the movement of coal by rail. Floods interfered with mining to some extent, but the chief damage done was to railroads, the Delaware, Lackawanna & Western, Erie, and the New York, Lackawanna & Western being the chief sufferers. The Delaware, Lackawanna & Western has been obliged to ship over the Jersey Central tracks, the Lehigh Valley and the Central bridges across the Delaware at Easton standing the flood in spite of the highest water on record. There are reports still of coal being sold by independent operators at below regular prices, but these sales do not affect the market any. Demand at some points, notably at Philadelphia, is reported better, but at New York there is no change. It appears that the average f. o. b. price on all prepared sizes in September at New York harbor shipping ports was $4.81 per ton; the average of the regular list prices was $4.87½.

BITUMINOUS.

The Atlantic Seaboard bituminous trade continues dull and inactive. The anticipated improvement in demand, which sanguine producers have been prophesying for some time past, has not yet materialized, and is still a thing of to-morrow. In fact, it begins to look as though trade might be rather slack all winter. Abundant water power, strikes that temporarily tied up many industrial plants, and a general slackening in industrial activity in the East all combine to cut down demand, while the productive capacity of the mines is larger than ever.

A report that leading producers of bituminous had agreed to cut prices 50c. per ton, has been given considerable prominence by the daily press. Apparently some new reporter discovered that coal was selling for less than the prices named last spring, and some editor, who ought to have had more sense, gave the fact prominence As a matter of fact, leading producers have not decided to cut the prices 50c. a ton, and the ordinary grades of Clearfield are selling, f. o. b. New York harbor shipping port, for $1 less than last spring's quotations.

The storms of the week interfered with the coastwise movement of coal, and to some extent with the rail movement, but not enough to affect market conditions materially. Car-supply continues equal to the demand of shippers, though it is not quite as good as it has been.

Demand from the far East continues slack, and not much coal is going forward to that territory. Consumers at shoal water ports are far better supplied than has been the case at this season in past years. Along Long Island sound, though business is better than in other consuming territories, there is not much doing. Demand at New York harbor continues quiet, and the full supply of the small sizes of anthracite continues to affect the consumption of bituminous. All-rail trade maintains a fairly steady demand. Transportation from the mines to tidewater, though suffering a little from the weather conditions, is fairly prompt. Car supply at the mines is up to the needs of producers, who, for the most part, are running about half time. The coastwise vessel market, which a week ago was declining, with vessels plentiful, has felt the affects of the storm, and rates are a trifle firmer.

At New York harbor ordinary grades of Clearfield are quoted at $2.50@$2.60, f. o. b. shipping port. Some grades may fetch as high as $2.75, and some coal that shippers wish to get rid of is selling as low as $2.25.

Birmingham. Oct. 12.

(From Our Special Correspondent.)

Coal operators in this State announce that they have a fair demand for the product, but that there is room for more orders.

Development in coal lands is reported from Blount, Jefferson, Tuskaloosa and Bibb counties in this State. Dr. G. B. Crowe, a prospector, is making some heavy drillings in coal lands in Tuskaloosa county, near Davis creek. He will escort a party of coal operators to that section shortly to investigate the drilling.

The production of coke in Alabama is holding up exceptionally well. The 200 ovens constructed for the Sloss-Sheffield Steel and Iron Company at the Flat Top mines, in the western part of Jefferson county, are now in full operation and producing a good quantity of coke.

Chicago. Oct. 12.

(From Our Special Correspondent.)

Again the coal trade is somewhat sluggish, as concerns sales of both anthracite and bituminous, owing to the mild weather. The increase that began two weeks ago and was ascribed to cold weather, proved only temporary. There is little probability of a really active market before cold weather comes for good. Country business especially is falling away, the city trade being bettered by the coming home of the people who went away for summer vacations. Meanwhile large stocks of anthracite are steadily growing larger in the yards and on the docks of wholesalers. Transportation troubles are increasing, but not to the extent feared or prophesied by many dealers a month ago. There are no signs, as yet, that there will be serious shortage of anthracite anywhere.

In the bituminous market the transportation problem is more serious than in the anthracite, but even here the condition of things is not worse than it was a week ago. Shipments from Indiana are considerably delayed for lack of cars, and Illinois mines find the same impediment in a less degree, but the trade is being supplied, to-morrow if not to-day.

As a result of the lightening of pressure on the mines and wholesalers, Indiana and Illinois high grade coal is 10@25c. lower on the minimum prices, lump being now $2.20@$2.90, run-of-mine, $2@$2.30, and screenings, $1.25@$1.70. There has been a good market for the cheaper grades of Illinois and Indiana. Smokeless does not yet find extensive favor with consumers; it is, however, in better demand than a week ago, and sells at discounts of 10@40c. from the list prices of $4.30 for lump and egg and $3.90 for run-of-mine. Youghiogheny is in steady and in fair demand at $3.70@$3.85, as last week; Pittsburg is selling somewhat unevenly, the demand fluctuating considerably, though as good on the average as it usually is, at $3.60@$3.80. Hocking is in good demand at close to the list prices—$3.90 for lump and $3.65 for run-of-mine.

Cleveland. Oct. 13.

(From Our Special Correspondent.)

The coke situation during the past week or so has been a little easier. The lessening of the activity among the furnaces has thrown some considerable coke upon the market for disposal, but this has been in part offset by the fact that the ovens have ceased to operate as extensively as they did, thus shortening the supply of material. This reduction of output has been a matter of accident rather than of policy. Prices have eased and then stiffened again, and are now holding well up. The prevailing price is $3 for good high class 72-hour foundry coke, some of the high sulphur grades being shaded a little, $2.75 being accepted.

The demand for coke among the foundries has not been quite so heavy and the factory consumption of coal has eased a little under the lessening of the operations of the factories. This has softened the prices some, the market being a little weak in spots. The operators had hoped somewhat to increase prices this fall, but find that an impossibility under existing circumstances. Nevertheless, the demand is such as to begin to tax the capacities of the railroads and the perennial shortage of cars appears.

The movement of coal up the lakes is again being delayed by a shortage of cars at the head of the lakes, by the light receipts at the lower lake docks, and by the fact that the docks in the upper lake region have become more or less congested. The market conditions are not, therefore, altogether favorable. The boat supply on the lakes for the transportation of this material is all that could have been desired. The whole market is steady, therefore, and inclined to be easy.

Pittsburg. Oct. 14.

(From Our Special Correspondent.)

Coal.—The mines in the Pittsburg district are running more fully than a week ago, the supply of railroad cars being better, but not sufficient to meet the demand. The closing of a number of iron and steel mills has not had any effect on the coal trade and the prices established last April are firmly maintained. Heavy shipments were made to lake ports during the week. A rise in the rivers enabled the Monongahela River Consolidated Coal & Coke Company to get out about 2,000,000 bushels. A large number of empty coal boats and barges were returned on the rise and all the river mines are in steady operation.

Connellsville Coke.—The curtailment of the pig iron production has resulted in a further heavy decline in the production of coke, but the prices have not been affected so far. Furnace coke is still quoted at $2@$2.25, and foundry at $2.75@$3. About 2,000 more ovens are out and the production has declined about 10,000 tons in one week. The *Courier* in its last report gives the production for the previous week at 205,120 tons. The shipments for the week were 9,795 cars, distributed as follows: To Pittsburg and river points, 4,015 cars; to points west of Pittsburg, 4,351 cars; to points east of Connellsville, 1,429 cars. This was a decrease from the previous week's shipments of 706 cars.

San Francisco. Oct. 10.

(From Our Special Correspondent.)

The coal market continues quiet, with little change in demand or prices. Stocks are good, except for Eastern coals.

Quotations show very little change. Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle & Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; White Ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite; $8.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is slightly nominal at $14 for Pennsylvania anthracite, and $13 for Cumberland, with very light stocks. Foreign coal in cargo lots is quoted at $13

for Welch anthracite; $8.50 for cannel; $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. Oct. 14.

Export trade here continues very quiet. Some business is being done to South American ports, but in a rather limited way.

Messrs. Hull, Blyth & Co., of London and Cardiff: There is no change with regard to the Welsh coal market, which remains quiet and inactive. Quotations are: Best Welsh steam coal, $3.72; seconds, $3,54; thirds, $3.49; dry coals, $3.36; best Monmouthshire, $3.30@$3.36; seconds, $3.24; best small steam coal, $2.10; seconds, $1.98; other sorts, $1.80.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market is unchanged, with a fair amount of chartering being done. Some rates quoted from Cardiff are: Marseilles, $1.35; Genoa, $1.20; Naples, $1.20; Singapore, $3; Las Palmas, $1.44; St. Vincent, $1.56; Rio Janeiro, $2.52; Santos, $2.88; Buenos Aires, $2.52.

IRON TRADE REVIEW.

New York, Oct. 14.

The movement for restricting the production of pig iron makes some progress, and several furnaces in the Pittsburg district and in the Mahoning and Shenango valleys have already shut down. Several companies also, which did not join in the movement, have agreed to sell no iron for third quarter delivery. Most of these concerns, however, are companies which use their own iron, chiefly in the manufacture of steel, and have little to dispose of outside. Buying continues on a very restricted scale, purchases being chiefly for immediate delivery.

In steel billets there is talk of cutting of prices, which, however, cannot be confirmed. The nominal price remains at $27 Pittsburg, for bessemer billets, but very few sales indeed are reported.

In finished material the story is very much the same, purchases being chiefly for moderate-sized lots for nearby delivery. Prices are rather weak, and there is a good deal of talk of concessions, but it is naturally difficult to trace out, or verify, these rumors.

It is reported from Pittsburg that the deal for the sale of one-half interest in the Clairton steel plant to the United States Steel Corporation has fallen through, and that the sale has not been consummated, and possibly will not be completed.

Birmingham. Oct. 12.

(*From Our Special Correspondent.*)

The announcement made some days ago that the Southern Iron Committee, which is composed of the railroads handling the products of the Southern furnaces and mills, had finally decided to acquiesce in the request of the furnace interests for a reduction of 50c. per ton in iron freight rates, was received with considerable appreciation. During the past week all shipments were held up until October 10, when the said reduction became effective, and the movement started. Last Wednesday orders for empty cars were placed with the railroad representatives and the loading commenced. In less than a week several hundred carloads of iron will be moved, and many more cars are being placed to be loaded.

The southern furnacemen are making an effort to maintain prices, and the resolution to uphold quotations adopted at the recent meeting, will be kept up rigidly. During the past week an investigation of sales books of two of the larger iron producing concerns in the Birmingham district was made for the purpose of establishing the average selling price of iron and thereby regulating the mining wage in this State. The miners in the employ of the Tennessee Coal, Iron and Railroad Company ascertained that the average price of the iron sold by that company during the past month did not average $11, and the mining wage was reduced 5c. under the maximum wage, 57c. per ton. The miners with the Sloss-Sheffield Steel and Iron Company ascertained the average price of the iron sold by the company to be about $11.25 per ton, and a reduction of 2½c. per ton, under the maximum, was made in the mining wage. The Sloss-Sheffield Company is said to have sold about its make for the past month, or something like 30,000 tons, while the Tennessee Company sold only about half that quantity, but a like amount was used in its steel plant at Ensley.

The curtailment in production in Alabama and the Southern territory in general has not as yet been put into full effect. While the majority of the furnace interests which were represented in the meeting held the first part of the month agreed to the proposition, it is asserted that one of the larger companies in the territory had to secure sanction from directors before the full agreement could be entered into. The committee named to arrange the curtailment will have the arrangements all figured out, it is believed, before the end of this week, and then approximately 25 per cent of the total production will be cut out. This will have a tendency to work off much of the accumulated stock in this section. W. H. Hassinger, of the Republic Iron and Steel Company, and J. W. McQueen, of the Sloss-Sheffield Company, were named as the committee on curtailment.

There is no denial of the statement that eastern consumers are getting southern irons at $1 under the quotations made western purchasers That prices are being maintained appears to be a certainty. No. 2 foundry is given at $11.75, western quotations.

The following quotations are made in this district (western): No. 1 foundry, $12.25@$12.50; No. 2 foundry, $11.75@$12; No. 3 foundry, $11.25@$11.50; No. 4 foundry, $10.75@$11; gray forge, $10@$10.50; No. 1 soft, $12.25@$12.50; No. 2 soft, $11.75@$12.

In finished iron and steel the conditions are favorable. The three mills in the immediate Birmingham district are doing well, and shipments are fairly good. The demand for finished iron and steel is beginning to look up. Announcement comes from Anniston that a spike department will be constructed at the Weller rolling mills, an addition to cost about $15,000.

The steel plant at Ensley is in active operation and turning out a large quantity of steel billets and rails. The production of two blast furnaces at Ensley is required for the steel plant.

Chicago. Oct. 12.

(*From Our Special Correspondent.*)

If any change is occurring in the pig iron market, it is a movement down-hill. The struggle is one of agents to sell, not of consumers to buy, and prices have not risen, while sales continue to be of the small-order, quick-delivery kind. There is a feeling on the part of dealers in Southern that the rate on this iron must come down; it is now $4.35 and ought to be, according to dealers, not more than $4 or $4.10. Sooner or later, if the present depression continues, the rate must be lowered.

The few sales that are being made for more than 500 tons are for Southern in the neighborhood of $10.50 Birmingham, or $14.85 Chicago. For smaller lots than 500 tons, the prices are 50c.@$1 higher. Northern in general is $1 higher than Southern, and finding no better sales as regards time to qualify.

Coke is in good demand and the supply is well regulated by the demand. The price of soke continues $5.50@$5.75.

Cleveland. Oct. 13.

(*From Our Special Correspondent.*)

Iron Ore.—The participation of the fleet of the Steel Corporation in the transportation of the wild ore remaining to be brought down the lakes has complicated the situation. The lessening of the movement of that material down the lakes has permitted greater speed in shipment, accentuating the surplus of tonnage available for the movement. The easing up in the movement indicates that the shipment for October will not exceed 2,500,000 tons, bringing the possible movement for the year to about 25,000,000 tons. Rates of carriage have held firm through policy on the part of the shippers. They are 80c. from Duluth; 72½c. from Marquette; and 60c. from Escanaba. Nothing is being heard of further ore sales, and it is hardly likely that anything will now be done until the contracting for 1904 material begins.

Pig Iron.—The buying of foundry iron is altogether for spot delivery, but a few small inquiries appearing for material to be delivered through the remainder of the year. The buying has been steady, nevertheless, and the past week has shown an increase in the demand. The generality of orders has run between 100 and 500 tons, with one inquiry for 3,000 tons to be closed soon. One contract of 1,000 tons was closed the past week, entailing deliveries for three months ahead. The larger contract was for November delivery. The reduction in the freight rate on pig iron from the Birmingham district brought a corresponding reduction in the price of Northern pig iron to meet the Southern competition, No. 2 going to $4.50 in the Valleys, which is equivalent to a cut of 25c. below the Southern price at $11.75 Birmingham. Bessemer and basic are almost entirely off the market and are not quotable, the supply being limited and the demand very light. The curtailment of production is now being carried on with the result that the piling of iron is not quite as heavy as it has been. Shipments away from the furnaces have been heavy.

Finished Material.—The demand for steel rails has increased slightly, but reports that prices are being cut have prevented buying until the reductions have either run their length, or it has been settled that there is to be no cut It cannot be established that the association prices have been varied from, although this is the general supposition among some of the buyers, cuts of $2 a ton having been talked of. The fact that bar iron has been selling so low has caused it to be substituted for steel, with the result that many of the bar iron mills are filled with business, to the point of congestion, thus strengthening the market. While the situation is stronger, the prices have not advanced, merely gravitating to a stable basis at 1.45c. Youngstown. Steel bars, despite efforts to put them down, have held their own at 1.60c., Pittsburg, for bessemer, and 1.70c., Pittsburg, for open-hearth. The sheet trade is weak. In fact, it is much easier to get lower terms for good orders than it has been at any time this year. It is now generally understood that the various gauges of sheets can be obtained at from $2 to $3 off list, while the published lists are being held to nominally, as far as authorized quotations go. This leaves the prices unchanged at 3.05c. for No. 27 black sheets out of stock as a basis. There have been reports also of reductions in the price of billets, and these seem to be well based, as far as the independent concerns go. It has been heard that independent concerns have cut the price to $26, with some talk of a price even lower than that. This report, however, cannot be confirmed. It is known that the association mills are holding for $27.50. Cleveland mills have added nothing to their tonnage. The plate trade is dull, a reduction in the available tonnage being made by the closing of some car and locomotive shops in this territory. The price holds at 1.60c., Pittsburg. Structural is also dull, but steady.

New York. Oct. 14.

Pig Iron.—There is no improvement in demand. Buying is light, as is the rule on a falling market. We quote: No. IX foundry, $16.75; No. 2X, $15.75, while No. 2 plain can be had for 50c. less; gray forge, $14.75. For Southern iron, on dock, quotations are: No. 1 foundry, $15; No. 2, $14.50; No. 3, $14.

Bar Iron and Steel.—The market is quiet. Prices for large lots on dock are: Refined bars, 1.55@1.60c.; soft steel bars, 1.70@1.80c.

Plates.—No immediate improvement in local demand seems likely. Sheared plates are quoted as follows: Tank, ¼ in. and heavier, 1.78@1.83c.; flange, 1.95@2.05c.; marine, 2.10@2.15c.

Steel Rails.—The quotations remain $28 for standard sections, f. o. b. mills; light rails, $33@$36, according to weight.

Structural Material.—Local demand continues light. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees.

Philadelphia. Oct. 14.

(*From Our Special Correspondent.*)

Pig Iron.—The pig iron market is practically in the same condition it was a week ago. Some dealers say business is better; two or three say a reaction has set in. Founders say they have not been able to obtain any better terms on No. 2 iron than last week. Mill owners, who have been sounding the market, have been scared away from placing large orders, as they believed that forge iron is bound to go still lower. The reduced price this week has brought very little new business. Quite a number of large consumers are on the point of placing orders, but they are waiting to see when it is the right moment to strike. Business, of necessity, is better than a month ago among the smaller consumers, who for six months have been buying in a hand-to-mouth way. It would hardly be fair to say the market is firmer, but conditions are more satisfactory, and there is a stronger tone. Quotations do not amount to much, but they can be given as $17 for No. 1 X, although there are brands that that money will not buy. No. 2 X ranges from $15 to $16; No. 2 plain $15; standard and gray forge $14.50; basic iron $14.50; low phosphorus $21.50.

Steel Billets.—Rumors are afloat today concerning transactions in billets in Western Pennsylvania, intimating that large sales have been quietly made this week, which if true would have a decided influence on some Eastern buyers. Our people will wait and see. Some few lots of open-hearth steel have been bought below the billet pool price, and all the material that is wanted for the present can be had under this figure. Stocks of billets are rather low among us, but buyers are not to be moved from their established policy of buying only as they need. Quotations are given at $27.

Bars.—It seems impossible for merchant bar to find a resting place. Orders are hawked around from mill to mill and the last bidder takes the order, as a rule. Mill owners are complaining bitterly about the absence of any controlling influence, but it is not probable that the association, as such, will undertake to bring peace. There are too many old sores to be poulticed. Best refined is quoted nominally at 1.50@1.60c.; steel bars are 1.75@2c.

Sheets.—The expectations of some of our sheet iron manufacturers for this month have not been realized; they are disappointed in the action of a few of the large users of sheets and one or two mill managements are actually considering the advisability of reducing production. A good deal of shading has been going on for large orders which leaves the manufacturer a very narraw margin.

Pipes.—A number of orders for pipe were unexpectedly placed this week. Inducements in the way of discounts were the cause. The sizes were small.

Tubes.—There is a very good demand for tubes. Buyers are keeping a fair stock on hand and still make a rule of covering requirements as soon as new contracts are placed.

Nails.—Nails are in moderate demand for wire, while cut nails are very dull.

Merchant Steel.—The users of merchant steel throughout the East are doing better than during the summer. There seems to be a quiet return to the old-time policy of buying more than is needed for work in hand.

Plates.—Orders have been submitted from steel car makers, and one or two of our eastern mills, it is said, hope to participate in the distribution. Boiler plate is doing better than any other kind. In a large way sheared steel and universals are 1.75c.

Structural Material.—A fair amount of new work has recently presented itself, but the buyers are not placing orders for all they need because they find the mills are in shape to make quite prompt deliveries.

Steel Rails.—Some new business has been sent to mills since Monday, largely for electric roads. The mill managements have always kept themselves in shape so they can take care of these orders with considerable promptitude.

Old Rails.—Old rails are quoted at $17.50 for iron; $14.50 for steel.

Scrap.—Scrap is accumulating in the hands of dealers. Prices are weak and very little material is changing hands. Heavy steel scrap is quoted at $14; No. 1 wrought railroad, $16@$17; country scrap, $14.50.

Pittsburg. Oct. 13.

(*From Our Special Correspondent.*)

As indicated last week, the formal order to restrict pig iron production in the Central West was issued and as a result a number of furnaces have already closed and others will be shut down when convenient between now and the end of the year. The result of the work of the committee appointed to arrange the details was more satisfactory than had been anticipated. Of the total number of furnaces in the Pittsburg and surrounding districts the production of 83 per cent of them will be curtailed by 25 per cent. While 17 per cent would not enter the agreement, several interests have agreed not to sell any iron during the quarter, and among them is the Jones & Laughlin Steel Company. So far the restriction movement has not had the desired effect on the iron and steel markets and the outlook to-day is not at all encouraging. The continued decline in industrial stocks has had a depressing effect on the markets, which was increased during the week by the closing of a number of mills through lack of orders Strong efforts are made by the management of different plants to prevent publicity when it is found necessary to close a mill or two. The other day the 35 and 40-in. plate mills of the big Homestead steel works were shut down, and, according to report, for an indefinite period. This affected the stock market to a certain extent and promptly brought out an official denial from the Carnegie Steel Company, it being stated that the two mills would be started again within a week. It is understood that several other departments of the Homestead plant have closed. At the American works of the Jones & Laughlin Steel Company several mills have been shut down, but it is announced that they soon will be put in operation again. Despite the efforts of manufacturing interests to present a favorable view of the situation it cannot be disputed that the iron and steel trade is dull, but there are strong indications that affairs soon will brighten. There is no buying of any consequence at present and quotations are merely nominal. Business continues brisk in pipes and tubes and wire products, and prices in all finished lines, with the exception of sheets, seem to be well maintained. But few sales of pig iron except of the foundry grade, were made during the week.

The steel billet market seems to be about as firm as it was a week ago, and the association price of $27 for bessemer billets is being strictly adhered to, but there have been no sales of any consequence. At the meeting of the plate pool in New York prices which have been well maintained for about two years were reaffirmed. The cut-nail makers also met and reaffirmed prices, but it is understood that considerable shading is being done. The wire-nail market is very firm, and trade is remarkably good. In sheets there is but little change. The trouble between the Amalgamated Association of Iron, Steel & Tin Workers and the American Sheet Steel Company in the matter of exceeding the limit at the New Philadelphia plant has been adjusted and the works are being operated as usual, a special agreement having been entered into as to the output. The association still has a strike on at the sheet plant of the Stark Rolling Mill Company at Canton, O., but it has not interfered with the operation of works. The company insists on an unlimited output, and many members of the Amalgamated Association have refused to obey the strike order. The strike of the association at the Continental plant of the National Tube Company in this city is still on, but the company has succeeded in supplying the places of the strikers. Members continue to express dissatisfaction over the manner in which the affairs of the organization are being conducted, and there is a movement on to form another association of iron and steel workers which has strong support in the Wheeling district. The deal made last July which gave the United States Steel Corporation a half interest in the Clairton Steel Company, a subsidiary concern of the Crucible Steel Company of America, has fallen through. President W. P. Snyder, of the Clairton Company, went to New York last week to obtain a settlement of the Steel Corporation's share of a call on the $6,000,000 cash, subscribed for the Clairton treasury when the stock was divided. The only announcement made of the result of the visit was that "obstacles have arisen which prevent the plans beilng carried out." The failure of this deal affected the market.

President W. E. Corey, of the United States Steel Corporation, headed a party of officials, which arrived in Pittsburg yesterday. An inspection of the different properties of the corporation is to be made. The party went to the Edgar Thomson steel rail plant, and from there to McKeesport, where the big tube plant was inspected, and also the site for the proposed $10,000,000 addition. After a visit to the Homestead and other steel works in this district the party went west. The new plant of the American Bridge Company at Ambridge, 20 miles west of Pittsburg, was visited to-day. The party will go to Cleveland and Lorain and from there to Chicago. Some of the members will visit the ore fields and the others will return to New York about the first of next week.

Pig Iron.—There is nothing doing in bessemer iron and the lowest price quoted is $15.50, Valley, but this price is for odd lots, and it is doubtful if a large order could be placed for less than $16. Several lots of foundry No. 2 have been sold during the week at prices ranging from $15.25 to $15.75, Pittsburg. Gray forge is very quiet, and it is offered as low as $14.50, Pittsburg.

Steel.—Bessemer steel billets are held firmly at the association price of $27, but few sales were made, and the market is extremely dull. Prices on all finished steel products are firm, but little new business is being booked. Plates and bars continue to be quoted at 1.60c.

Sheets.—There is no change in the market, conditions being about the same as a month ago No. 28 black sheets are quoted at 2.75c. and galvanized at 3.85c., but it is reported that these rates are being shaded.

Ferro-Manganese.—The market for domestic 80 per cent. remains unchanged at $48.

Cartagena, Spain. Sept. 26.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—Shipments from this port for the week have included only one cargo, 2,100 tons manganiferous ore to Great Britain. There is nothing fresh to report in the local market. There is not much demand for autumn shipment, but there are some inquiries for both dry ores and manganiferous ores for delivery in the first part of next year.

Prices are firm at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 10s. 6d. per ton, f. o. b. Cartagena.

CHEMICALS AND MINERALS.

(See also Prices-Current on page 608.)

New York, Oct. 14.

Contracting for future supplies of raw materials and manufactured products is more general, and with few exceptions prices show a hardening tendency. Already there has been an advance of 5c. per 100 lb. in domestic caustic soda, as a result of an increased consumption in the mercerizing and kindred industries. Raw materials are particularly strong, and the indications are that prices will rule high for some time to come. This is rather unfortunate for manufacturers whose competitors are becoming more aggressive.

Speaking of competition calls attention to the recent government contracts for pigments for the Brooklyn Navy Yard. The lowest bid for 375,000 lb. white lead in oil was about 5.38c. per lb. for kegs and tins, and for 60,000 lb. red lead, 5.59c., both made by the United Lead Company, the new combination. The prices quoted are below present market values; they are considered very low, and intimate that future competition will be sharp.

Initial steps have been taken by James Lee & Co., of New York, to introduce a new brand of cyanide, made in Great Britain, into this market, the recommendation, besides high cyanogen strength, being that it is meeting with favor in Australia and India.

As regards the foreign chemical trade, it is interesting to note that September, usually the opening month for contracting over the ensuing year, has shown little new business. Buyers, it seems, are without confidence, owing to the uncertainty of the future.

Cyanide.—The only item of interest is the appearance in this market of the brand made by the United Alkali Company, of Great Britain. This new cyanide is manufactured in the form of nodules, tests 105 to 110 per cent cyanogen, is said to be free from sulphides, and can be shipped economically in zinc-lined cases of 224 lb. net weight. Trade, however, is still only of a hand-to-mouth character, and orders for the various brands sold here will be taken on the basis of 20c. per lb. A few small lots of cyanide have been exported to Mexico at about current quotations.

Bleaching Powder.—Practically the only business doing is in small parcels among jobbers. First hands are still undecided about giving out quotations for next year's delivery, but it is understood figures will soon be forthcoming. At present prime Liverpool brands for immediate shipment are quoted at $1.10@$1.12½ per 100 lb. in New York, and Continental at 87½c.@$1.05, while domestic may be had at 85c.@$1.00, f. o. b. works.

Copper Sulphate.—Continued weakness in metal prices has adversely influenced the sulphate market. Sellers quote $4.75 per 100 lb., f. o. b. works, but less would doubtless be accepted on business. Consumers of importance have enough supplies on hand to meet their requirements for the present. It is the small buyer who makes the market for the jobber, hence current transactions are purely of a retail character.

Acids.—Better contract deliveries are reported for most commercial acids, and prices remain unchanged.

We quote, as below, per 100 lbs., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, Com'l	$5.25@5.50
Muriatic, 20°	1.00	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—The low ocean freight rates, until recently offered by Sicilian exporters, have rather discouraged traffic in brimstone to Atlantic ports, as ship owners can realize more money in the cereal trade in the Mediterranean. Consequently, supplies of brimstone in America have diminished to a point where holders can command a substantial advance in price. Recently best unmixed seconds have sold in New York at $24.50@$25 per ton for prompt delivery, which are the highest prices in a long while. Simultaneously shipments have been raised to $22⅝@$22½, as exporters in Sicily realize that they will have to pay a higher ocean freight rate if they want vessel room at this season. The exports to the United States last month were comparatively few, and unless the movement for October increases, consumers will have to pay high prices for some time to come. The average monthly consumption of Sicilian brimstone in this country is about 12,000 tons, of which about 80 per cent is in best unmixed seconds.

Sicilian Brimstone Market.—Messrs. Emil Fog & Sons, of Messina, write under date of September 30 as follows: "We notice a considerable reduction in exports in August—15,000 tons less than last year. This deficiency was chiefly to the United States, which in August bought only 10,478 tons, against 19,673 last year, partly due, no doubt, to the competition by the Louisiana mines, which provide most of the Western States, and also to the scarcity of tonnage and rise in freights. Rates to New York have advanced from 7s. to 8s. 6d., prompt steamers almost wanting. Exports to Sweden and Norway are also diminishing; in August 388 tons, against 2,405 tons in 1902. In Norway most of the paper mills near the seaboards are substituting Hereshoff's pyrite burners for brimstone, but the mills in the interior will continue to use brimstone, owing to expensive transportations. Sellers of pyrites offer all kinds of inducements—low price, long contract and removal of the obnoxious residues. Prices declined slightly at Girgenti. Through the lower offerings by dissidents the Anglo-Sicilian Com-

pany was also obliged to reduce prices 3d. to 6d. At Catania the market is in better control by the Anglo-Sicilian Company, which, profiting by the wants of the local refineries, has raised prices 2s. Stocks of refined brimstone are small, and the consumption seems to be greatly expanding. For New York and Portland 9s. is offered for a 4,000-ton boat We quote sulphur as follows: Best unmixed seconds, in bulk, 80s. 9d. per long ton; best unmixed seconds, ground, 89s.; best thirds, bulk, 78s. 6d.; current thirds, bulk, 76s. 9d.; refined block, 87s. 9d.@90s. 3d.; sublimed flowers, pure, in bags, 106s. 6d.; current, 99s. 6d.; current, 99s. 6d.; commercial, 92s. 9d.; refined roll, 94s.@99s. 3d., and in stick, 102s. 6d.@106s. 3d.

Pyrites.—Importations of copper pyrites from Spain are more frequent, and this week the Pennsylvania Salt Manufacturing Company reported 6,554 metric tons at New York. Acid makers are ordering pyrites in a better way on regular contracts, and occasionally a small lot is sold at a slight change in price to other than season customers. On the whole, however, the average prices remain as quoted for some time past.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines delivered at Atlantic ports.

Nitrate of Soda.—The spot market has advanced, owing to delayed arrivals, and a threatened strike among laborers at nitrate ports on the west coast. Spot is quoted at $2.25 per 100 lb., the last sale having been made around $2.17. Futures are rated at $2.05 for the first half of next year, and $2 for the last six months. These prices yield a fair profit.

The Salar del Carmen Nitrate Company has declared an interim dividend of 4s. (96c.) per share, payable October 15.

Chilean Nitrate of Soda Market.—Messrs. Jackson Brothers, of Valparaiso, write us under date of August 22, as follows: The market has continued very firm owing to the small quantity of nitrate disposable for this year, which has caused producers to hold out for higher prices. Sales of 95 per cent have been made for August-September at 6s. 10d.@6s. 11½d.; November-December 6s. 9½d.@6d. 10½d.; January-February, 6s. 8½d.@6s. 9½d.; January-March, 6s. 8d.; also monthly lots from January, 1904 to March, 1905 at 6s. 6d.—all alongside terms. A few sales of 96 per cent have been made at 6s. 11½d.@7s., alongside for prompt deliveries. The production for the first seven months this year amounted to 18,134,000 qtls., against 16,401,726 qtls. during last year; and the consumption of the world for the same term 24,193,000 qtls. against 21,007,000 qtls., respectively. We quote 95 per cent September-October, 6s. 11½d.; November-December, 6s. 10½d.; January-February, 6s. 9d., and 96 per cent, any delivery this year 6s. 11½d.@7s., all ordinary terms sellers. The price of 6s. 11½d. with an all-round freight of 16s. 3d. stands in 8s. 6¾d. per cwt., net cost and freight, without purchasing commission. Reported sales for the fortnight were 768,000 qtls., and re-sales, 77,000 qtls.

Sulphate of Ammonia.—Trade is almost featureless, excepting that prices have weakened to $3 per 100 lb. for domestic gas liquor, and $3.10 for foreign. This week 497 bags were received at New York from Halifax, Nova Scotia. Reports from Great Britain state that the exports in the eight months ending August 31 were 13,603 long tons, which is 2,295 tons less than for the corresponding period last year.

Phosphates.—A canvass of the trade for the fiscal year ending August 31 shows that there were approximately 1,035,359 tons of phosphates shipped by water from Florida, Tennessee and South Carolina, which is a substantial improvement over the previous year. These shipments contained about 347,546 tons of phosphoric acid, an amount that constitutes much the larger part of the consumption by superphosphate manufactures, not only in this country, but also in Europe As usual, Florida furnished the bulk of the phosphates shipped this year, say 79 per cent, principally high-grade rock, as shown below

The shipments of Florida phosphates from all seaports in the fiscal year ended August 31 were as follows, in long tons:

	1901-2.	1902-3.	Changes.
Brunswick	36,489	45,627	I. 9,138
Fernandina	183,433	74.570	D. 108,863
Port Inglis	....	73.548	I. 73.548
Savannah	160.553	178,555	I. 18,002
Tampa	35,190	69,175	I. 33,985
Total high-grade rock	415,665	441,475	I. 25,810
Tampa, land pebble	303,742	331,431	I. 27.689
Punta Gorda, river pebble	13,998	51,480	I. 37,482
Total pebble	317,740	382,911	I. 65.171
Grand total	733,405	824,386	I. 90,981

The total increase this year is equivalent to 12.4 per cent.

Of the total shipments this year 597,424 tons, or about 72 per cent, were for foreign markets, chiefly in high-grade rock for Germany. The domestic shipments were nearly all in pebble phosphates, principally land pebble. It is interesting to mention that the leading shippers this year were the Dutton Phosphate Company, Buttgenbach & Co., Dunnellon Phosphate Company, Schilmann & Bene, Joseph Hull & Co., and the Palmetto Phosphate Company.

Tennessee phosphate shipments through Pensacola in the year ended August 31 amounted to 116,330 tons, which shows an improvement over the previous twelve months. In addition there were exported through Norfolk, Va., New Orleans, La., and Charleston, S. C., this year 7,866 tons. The principal consumers abroad were France, Italy and Great Britain.

South Carolina rock shipments through Charleston and Beaufort this year were approximately 86,727 tons, which compared with 1901-1902 shows a marked falling off. A large part of this year's movement has been on account of British and French consumers.

In September there were shipped from Savannah 18,677 tons high grade Florida rock, making 104,124 tons in the 9 months, which compares with 127,110 tons in the corresponding period last year. It is noteworthy that the September shipments were the largest since April, 20,043 tons, which was the second best month this year, being led by March by about 3,000 tons.

Phosphates.	Per ton. f. or b.	United Kingdom or European ports. Unit.	Long ton.
*Fla. hard rock (77@80%)..	$7.00@$7.50	6¾@7¾d.	$10.53@11.70
*Fla. land peb. (68@73%)..	3.50@ 3.75	5⅛@5¾d.	7.70@ 8 05
†Tenn. (78@82%) export...	4.00@ 4.25	6⅛@7d.	10.40@11.20
†Tenn. 78% domestic.....	3.75@ 4.00	.....	.....
†Tenn. 75% domestic.....	3.50	.....	.....
†Tenn. 73@74% domestic..	2.95@ 3.20	.....	.....
†Tenn 70@72% domestic..	2.70@ 2.95	.....	.....
‡So. Car. land rock.....	....@ 3.25	.....	.....
‡So. Car. riv. rk. (55@63%).	2.75@ 3.00	4⅝ 5⅛d.	5.55@ 6.60
Algerian (63@70%).....	.....	5½@6¼d.	7.37@ 8.38
Algerian (58@63%).....	.....	4⅝@5¾d.	5.55@ 6.90
Gafsa (Tunis).....	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80 85%)....	.....	7¼@8¼d.	12.38@13.61

*Fernandina, Tampa, Brunswick, Savannah er Port Inglis.
‡Mt. Pleasant. †On vessels, Ashley River.

Liverpool. Oct. 7.

(*Special Report of Joseph P. Brunner & Co.*)

There is not much going on in heavy chemicals outside of contract deliveries, and interest at present is principally centered on the question of the proposed fiscal rearrangements in this country. Soda ash is without special feature and selling at the usual range as to market. For tierces, nearest values may be called about as follows: Leblanc ash, 48 per cent, £5@£5 10s.; 58 per cent, £5 10s.@£6 per ton, net cash; ammonia ash, 48 per cent, £4 5s@£4 10s.; 58 per cent, £4 10s.@£4 15s., net cash. Bags, 5s. per ton under price for tierces. Soda crystals are in fair request at generally £3 7s. 6d. per ton, less 5 per cent, for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is quiet as regards demand, but prices are steady, as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Special quotations for export to the Continent and a few other export quarters. Bleaching powder is quoted at 2¾d. per lb. for English make, but there is not much business reported. Bicarbonate of soda attracts a fair amount of attention from buyers, and the price is firm at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages; also spcial terms for a few favored markets. Sulphate of ammonia is fairly steady at about £12 10s.@£12 12s. 6d. per ton, less 2½ per cent for good gray, 24@25 per cent in double bags, f. o. b. here; but the demand is not very brisk, and with the season for larger supplies approaching present figures are hardly likely to be fully maintained unless the demand improves. Nitrate of soda is still quoted on spot at £10 2s. 6d.@£10 10s. per ton, less 2½ per cent for double bags, f. o. b. here, as to quantity and quality.

METAL MARKET.

New York, Oct. 14.

Gold and Silver Exports and Imports,

At all United States Ports in August and Year.

Metal	August. 1902.	August. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports	$2,306,714	$84,778	$30,468,290	$40,538,775
Imports	5,143,597	7,808,807	15,925,362	26,416,068
Excess	I. $2,837 883	I. $7.724,031	E.$10,540,928	E. 14,122,707
Silver:				
Exports	4,744,888	2,019,655	30,944,738	22,540,420
Imports	1,907,219	2,319,676	16,304.439	14,864,587
Excess	E. $2,937,669	I. $299,021	E.$14,640,299	$7,675,833

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending October 14, and for the years from January 1

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week..	$15,285	$48,565	$408,120	$102,905	E. $271,935
1903....	31,438 290	6,609,994	23.384,536	3,075,090	E. 45,137,742
1902....	24,122,898	3,123,851	20,384,4 4	939,1-9	E. 40,713,472
1901....	25,868,389	3,667,375	24,553,810	2,926,777	E. 43,463,489

The above statement includes Mexican and foreign silver in coin or bullion.

General trade is rather quiet, though the transportation returns and crop reports are favorable, for the most part. In the East, serious damage and inconvenience have resulted from storms and floods, which have interfered with railroad transportation.

The statement of the New York banks, including the 56 banks represented in the Clearing House for the week ending October 10, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts	$870,900,700	$874,647,900	$913,101,500
Deposits	942,688,600	872,340,600	897,615,100
Circulation	30,983,800	36.072,500	45.714,800
Specie	182,501,900	152,338,200	171,063,700
Legal tenders	70,653,500	67,274,300	69.917,200
Total reserve	$253,155,400	$219,612,500	$240,980,900
Legal requirements	235,672,150	218,085,150	224,403,775
Balance surplus	$17,483,350	$1,527,350	$16,577,123

Changes for the week this year were increases of $198,400 in loans and discounts, $400,700 in deposits, $40,100 in circulation, $3,585,300 in specie, and $2,-639,625 in surplus reserve; a decrease of $845,500 in legal tenders.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparisons made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd..	$152,338,200	....	$171,063,700	....
England	173,590.985	....	165.550.970	....
France	511,660.595	$221,492,010	490,187,600	$222,847,540
Germany	152,725.000	56,485,000	158,735,000	55,770,000
Spain	71,415,000	97,070,000	73.120.000	98,215,000
Netherlands	23,450.500	32,388,500	19,753,500	31,938,500
Belgium	16,196.665	8,098.335	14.920,000	7,460,000
Italy	80,400.000	10,264,000	99,660,000	11,926.000
Russia	361,945,000	35,520,000	402.075.000	36,900,000
Austria	227,700,000	61,625,000	228,940,000	62,400,000

The returns of the Associated Banks of New York are of date October 10 and the others October 8, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The London market has been strong, with rising tendency. The Indian Government has been a buyer to replenish its depleted reserves. Large shipments of gold have been made from Bombay, and it is very probable that considerable portions of these arrivals will be for the purchase of silver.

The United States Assay Office in New York city reports receipts of 80,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to October 1 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
India	£4,799,170	£4,475,975	D. £323.195
China	158,200	294,186	I. 135,986
Straits	390,820	721,879	I. 331,059
Total	£5,348,190	£5,492,040	I. £143,850

Receipts for the week this year were £111,000 in bar silver from New York, £5,000 from the West Indies, and £6,000 from Australia; total, £122,000. Shipments were £39,000 in bar silver to Bombay, £10,000 to Calcutta, and £5,000 to Colombo; total, £54,000.

Indian exchange continues steady, although comparatively little business has been done, on account of religious holidays, which have stopped business on the Indian bazaars. The Council bills offered in London, however, were all taken at an average of 16.03d. per rupee. The expected purchases of silver for Indian coinage have not yet made their appearance. The Government of the Straits Settlement last week issued an order prohibiting further import of dollars into the colony. Some comment on this will be found elsewhere.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.46¼	$0.47⅛
Peruvian soles and Chinese pesos	.42½	.45
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	4.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

1 October	Sterling Exchange.	—Silver— N. Y. Cts.	London, Pence.	—Copper— Lake, Cts. per lb.	Electrolytic, Cts. per lb.	London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	—Spelter— N. Y., Cts. per lb.	St. Louis, Cts. per lb.
8	4.85⅝	59⅜	27 7/16	12⅝ @12⅞	12⅛ @12¾	54⅜	26	4.35 @4.40	5.55 @5.60	5.40 @5.42½
9	4.85⅝	59⅜	27⅝	12⅝ @12⅞	12⅛ @12¾	54½	26	4.35 @4.40	5.55 @5.60	5.40 @5.42½
10	4.85⅛	59⅝	27 7/16	12⅝ @12¾	12⅛ @12⅝	....	26	4.35 @4.40	5.55 @5.60	5.40 @5.42½
12	4.85¼	59⅞	27⅝	12⅝ @12¾	12⅛ @12⅝	54⅛	25¾	4.35 @4.40	5.55 @5.60	5.40 @5.42½
13	4.85⅛	60⅛	28	12⅝ @12¾	12⅛ @12⅝	53⅝	25¾	4.35 @4.40	5.55 @5.60	5.40 @5.42½
14	4.85⅝	60¼	28 1/16	12⅝ @13¾	12⅛ @12⅝	54⅛	25¾	4.35 @4 40	5.55 @5.60	5.40 @5.42½

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars: the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—Dullness has reigned in the domestic copper market, due to the fact that buyers have been holding off; but producers generally have not pressed on the market. A fairly large volume of business has been done for export at slightly lower prices. The closing quotations are given as 12⅝@12¾c. for Lake; 12⅞@12⅝c. for electrolytic in ingots, cakes and wirebars; 12¼@12⅜c. for cathodes; 12¼@12⅜c. for casting copper.

The market for standard copper in London, which closed last week at £54 10s. for spot, £54 5s. for three months, opened on Monday at £54 5s. for spot, £54 2s. 6d. for three months. On Tuesday it declined 10s., which, however, it recovered on Wednesday, when the closing quotations are cabled as £54 7s. 6d. for both deliveries.

Refined and manufactured sorts we quote: English tough, £58@£58 10s.; best selected, £59@£60; strong sheets, £66@£67; India sheets, £63 10s.@£64 10s.; yellow metal, 6⅛d.

Exports and imports of copper at New York, Philadelphia and Baltimore, in the week of October 13, and for the year to date, were in long tons:

	Week.	Year.
Austria	....	4,012
Belgium	....	1,087
France	1,380	16,731
Germany	283	20,969
Holland	691	30,388
Italy	50	2,051
United Kingdom	376	13,711
Other countries	2	4,461
Total copper	2,782	93,410
Matte	....	286
Imports—		
Copper	220	20,769
Matte	....	984
Ore	....	35,355

Exports this week show an improvement, while imports have been less. Of the imports 100 tons were from Germany and 60 tons from Great Britain.

Tin.—The market has been very dull. Stocks on this side are small and spot tin is scarce, and the quantities which will arrive this month are not large. We quote spot tin at 25¾c.; October, 25½c.

The foreign market, which closed last week at £114 7s. 6d. for spot, £114 7s. 6d. for three months, opened 2s. 6d. lower on Monday. It fluctuated within narrow limits until Wednesday, when it advanced to £115 5s. for spot, £115 15s. for three months.

Lead is unchanged. The closing quotations are 4.27½@4.32½c. St. Louis, 4.35@4.40c. New York.

The foreign market is somewhat lower, Spanish lead being quoted at £11@£11 2s. 6d.; English lead 3s. 9d. higher.

Spanish Lead Market.—Messrs. Barrington & Holt, of Cartagena, write us under date of September 26 that the price of silver during the week has been 14.50 reals per ounce. Exchange has gone up 12 centimos, making it 34.15 pesetas to £1. Current price of pig lead on wharf has been 61.75 reales per quintal, which on above exchange is equal to £10 2s. 7d. per ton of 2,240 lb., f. o. b. Cartagena. Shipments have been 770,000 kgs. desilverized lead to Marseilles.

Spelter.—There is a better demand for spelter both for early and distant deliveries. We quote 5.40@5.42½c. St. Louis, 5.50@5.60c. New York.

The foreign market is a trifle lower, good ordinaries being quoted at £20 5s., specials 5s. higher.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt, of Cartagena, write us under date of September 26 that the market is quiet, the miners still holding their ore in stock, in hopes of better prices.

Antimony is dull and unchanged. We quote: Cookson's 7@7¼c.; Hallett's 6¼@6⅜c.; U. S. Star, 6@6¼c.; Italian and French, 6@6½c.; Japanese 5¾@5⅞c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Demand continues very good, and prices are firm. While the quotation remains $19 per oz., an advance in the price in the near future is considered quite probable.

Messrs. Eimer & Amend, of New York, quote prices for platinum in manufactured forms as follows: Heavy sheet and rod, 72c. per gram; foil and wire, 75c. per gram; platinum crucibles and dishes, 77c. per gram; perforated wire, like cones, Gooch crucibles, etc., 82c. per gram.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, while a slightly higher figure is quoted for smaller orders. The San Francisco quotations are $45@$46 per flask for domestic orders and $42@$43 for export. The London price is £8 7s. 6d. per flask, with the same quotation asked by second hands.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb.
No. 1, 99% ingots	33@37c.
No. 2, 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybde'm (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.
Ferro-Tungsten (37%)	38c.
Magnesium, pure (N. Y.)	60c.
Manganese	$2.75
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variations in price depend chiefly on size of order.

Missouri Zinc Ore Market. Oct. 10.

(From Our Special Correspondent.)

A break in the top price of zinc occurred this week for the first time in 30 weeks, going down a dollar to $39, but the assay basis remains at $34@$36 per ton for 60 per cent zinc. Lead continues firm at $56 per ton. Owing to the fact that several of the smelters have partially withdrawn from the market, and one has been entirely out of the market for three weeks, one can hear all kinds of rumors of smelter consolidations.

Following are the shipments of zinc and lead ores from the Joplin district for the week ending to-day:

	Zinc, lb.	Lead, lb.	Value.
Joplin	2,353,430	323,060	$49,045
Webb City and Carterville	2,213,800	481,780	49,995
Galena-Empire	898,310	100,650	17,655
Alba and Neck	537,910	.....	9,410
Oronogo	391,760	5,950	6,885
Duenweg	218,140	112,500	6,640
Granby	350,000	56,000	5,290
Carl Junction	241,340	.....	4,225
Aurora	330,120	9,040	4,080
Prosperity	220,360	8,680	3,985
Zincite	139,430	8,320	2,670
Mitchell	123,530	9,370	2,420
Central City	116,950	3,310	1,910
Cave Springs	95,530	3,000	1,755
Spurgeon	13,350	53,570	1,600
Springfield	.....	64,400	1,770
Carthage	36,260	6,930	775
Totals	8,280,220	1,246,560	$170,110
Forty-one weeks	386,997,100	45,184,570	$7,875,520

Zinc value: The week, $135,245; 41 weeks, $6,653,110.
Lead value: The week, $34,865; 41 weeks, $1,222,410.

The Missouri & Kansas Zinc Miners' Association did not wait, as was done a year ago, until the smelters had largely increased the reserve stock, before taking action. A meeting was held on Wednesday night and another will be held next Wednesday night, to discuss plans for preventing the accumulation of a large reserve stock. Exportation and a curtailment of the output are under consideration, with the probability that early arrangements will be completed to export a preliminary consignment of 250 to 500 tons, to be followed by other consignments as fast as possible, the idea expressed being favorable to the exportation of 2,000 to 5,000 tons. In order to prevent the smelters from keeping close tab on the movements, in relation to whatever policy will be pursued, an inside committee, or, as it is called, a club, has been formed by the larger producers, who will have full charge of dictating a policy and seeing that it is carried out. This committee will be composed of 25 members, from companies representing a little over 40 per cent of the average output each week.

Average Prices of Silver, per ounce Troy.

Month.	1903 London Pence.	1903 N. Y., Cents.	1902. London. Pence.	1902. N. Y., Cents.	1901. London, Pence.	1901. N. Y., Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.88	26.96	58.46
August	25.63	55.36	24.23	52.52	26.94	58.37
September	26.75	58.00	23.88	51.52	26.95	58.26
October	.....	.....	23.40	50.57	26.62	57.59
November	.....	.....	22.70	49.07	26.12	56.64
December	.....	.....	22.21	48.03	25.46	55.10
Year	.....	.....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

Average Prices of Copper.

Month.	New York. Electrolytic. 1903.	Electrolytic. 1902.	Lake. 1903.	Lake. 1902.	London. Standard. 1903.	Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.06
June	13.942	12.110	14.212	12.360	57.30	53.93
July	13.094	11.771	13.341	11.923	56.64	52.89
August	12.962	11.404	13.159	11.649	58.44	51.96
September	13.205	11.480	13.345	11.760	56.82	52.68
October	.....	11.449	.....	11.722	.....	52.18
November	.....	11.288	.....	11.553	.....	51.08
December	.....	11.430	.....	11.599	.....	50.95
Year	.....	11.626	.....	11.887	.....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.075	4.075	5.662	5.27
August	28.29	28.23	4.075	4.075	5.725	5.44
September	26.77	26.60	4.243	4.075	5.686	5.49
October	.....	26.07	.....	4.075	.....	5.38
November	.....	25.68	.....	4.075	.....	5.18
December	.....	25.68	.....	4.075	.....	4.78
Year	.....	26.79	.....	4.069	.....	4.84

NOTE.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.681c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537c.; for July, 5.507c; August, 5.55c, September 5.514c.

DIVIDENDS.

Name of company.	Date.	Per share.	Total.	Total to date.
†Alaska-Treadwell	Oct. 28	.37½	75,000	5,200,000
†Continental Zinc, Mo.	Oct. 1	.40	8,800	52,800
*Homestake, S. D.	Oct. 26	.25	54,600	12,258,150
Iron Silver, Colo.	Oct. 31	.10	50,000	2,850,000
Nova Scotia St. & C., com.	Oct. 16	3.00	123,600	515,000
†Nova Scotia St. & C., pf.	Oct. 16	2.00	20,600	206,000
‡Penna. Salt	Oct. 15	6.00	600,000	13,900,300
†Phila. Nat. Gas, com.	Nov. 2	.75	231,406	3,416,831
Spearfish, pf., S. Dak.	Oct. 2	.01	8,820	88,200
†U. S. Steel, com.	Dec. 30	.50	2,541,513	53,350,978
†U. S. Steel, pf.	Nov. 16	1.75	8,929,919	98,192,496

*Monthly. †Quarterly. ‡Semi-annually.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Best & Belcher	Nev.	..	Nov. 6	Nov. 27	.10
Champion	Cal.	..	Oct. 22	....	.50
Crown Point	Nev.	..	Oct. 7	Oct. 28	.10
Dexter-Tuscarora Con.	Nev.	1	Oct. 22	Nov. 11	.02
Gould & Curry	Nev.	..	Oct. 27	Nov. 13	.10
Indian Pete	Utah	1	Oct. 13	Oct. 25	.01
Julia Con.	Nev.	33	Oct. 6	Oct. 29	.03
Kentuck Con.	Nev.	..	Nov. 4	Nov. 25	.03
May Day	Utah	3	Oct. 14	Nov. 2	.02
New York Bonanza	Utah	..	Oct. 10	Oct. 31	.03
Middle Yuba	Cal.	..	Oct. 19	....	.01
Occidental	Nev.	..	Nov. 6	Nov. 27	.05
Orient	Cal.	..	Oct. 20	....	.35
Red Slide	Cal.	..	Nov. 6	....	.05
Seg. Belcher & Mides Con.	Nev.	..	Nov. 4	Nov. 24	.05
Sonora Quartz	Mex.	..	Nov. 4	....	.00½
Tonopah & Salt Lake	Nev.	2	Oct. 14	Oct. 31	.10
Utah Con.	Nev.	..	Oct. 8	Oct. 29	.10
Western Mineral	Cal.	..	Oct. 31	....	5.00

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	Oct. 7 H.	Oct. 7 L.	Oct. 8 H.	Oct. 8 L.	Oct. 9 H.	Oct. 9 L.	Oct. 10 H.	Oct. 10 L.	Oct. 12 H.	Oct. 12 L.	Oct. 13 H.	Oct. 13 L.	Sales.
Acacia, Colo.	1	1,500,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alice, Mont.	25	400,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Amalgamated c., Mont	100	1,538,879	41½	37⅝	38¾	35⅝	36	34½	37¼	35½	37	35⅝	37⅜	35¾	552,670
Anaconda c., Mont.	25	1,200,000	69¾	68¼	69⅜	66	66	65	65	63¼	64½	62	64	63½	5,620
Anaconda, Gold Colo.	2	1,000,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belcher, s.	3	104,000	.....	.....	1.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Best & Belcher, Nev.	3	100,000	.....	.....	.....	.....	.....	.....	.....	.....	1.35	1.30	.....	.....	450
Breece	25	200,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brunswick, Cal.	5	100,000	.....	.....	04½	.....	.....	.....	.....	.....	.....	.....	04½	.....	1,500
Caledonia, Nev.	1	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Choller	2½	112,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20	.....	400
C. K. & N., Colo.	1	1,500,000	18	.....	.....	.....	20	.....	.....	.....	.....	.....	.....	.....	1,500
Con. Cal. & Va., g.s., Nev	2½	216,000	1.30	.....	1.35	1.30	1.30	1.25	1.30	.....	1.25	.....	.....	.....	1,100
Cons. Imperial, Colo.	1	500,000	.....	.....	04½	.....	.....	.....	.....	.....	04	.....	.....	.....	2,000
Cripple Creek Con.	1	2,000,000	.....	.....	.....	.....	.....	.....	.....	.....	03	.....	.....	.....	1,000
Crown Point, Nev.	2½	100,000	.....	.....	.....	.....	.....	.....	21	.....	.....	.....	.....	.....	300
Daly, Utah	20	150,000	.....	.....	1.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	40
Elkton, g., Colo.	1	1,250,000	45	.....	.....	.....	.....	.....	.....	.....	.....	.....	48	.....	500
El Paso, Colo	1	650,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Golden Fleece, Colo.	1	600,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gould & Curry, Nev.	1	108,000	.....	.....	.....	.....	22	.....	.....	.....	.....	.....	.....	.....	300
Greene Con., c., Mex.	10	720,000	17⅛	17	17⅛	16⅞	16½	15⅜	16	.....	15⅜	14	14⅛	14⅛	17,107
Hale & Norcross, Nev	100	112,000	.....	.....	52	.....	.....	.....	.....	.....	.....	.....	.....	.....	190
Isabella, g., Colo.	1	400,000	.....	.....	.....	.....	10	.....	.....	.....	11	10	12	11	3,200
Jack Pot, Colo.	1	1,250,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Justice, Nev.	2	105,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Chief, Colo.	50	200,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, Nev.	3	100,800	.....	.....	.....	.....	.....	.....	1.05	.....	.....	.....	1.00	.....	200
Mollie Gibson, Colo.	5	1,000,000	05½	.....	.....	.....	05	.....	.....	.....	.....	.....	.....	.....	3,000
Moon Anchor, Colo.	5	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Occidental, Nev.	3	1,000,000	26	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
Ontario, Utah	100	150,000	.....	.....	.....	.....	.....	.....	.....	.....	5.50	.....	5.25	.....	120
Ophir, Nev.	3	100,800	.....	.....	1.60	.....	1.50	.....	.....	.....	1.50	.....	1.00	.....	700
Overman, Nev.	2	115,200	.....	.....	.....	.....	.....	.....	24	23	.....	.....	.....	.....	500
Pharmacist, Colo.	1	1,500,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phoenix, Ariz.	1	.....	.....	.....	05	.....	05	.....	05	.....	.....	.....	05	.....	400
Portland, Colo.	1	3,000,000	.....	.....	1.15	.....	.....	.....	1.25	.....	1.25	.....	.....	.....	300
Potosi, Nev.	1	112,000	.....	.....	24	.....	24	23	.....	.....	20	.....	20	.....	1,100
Savage, Nev.	3	112,000	.....	.....	.....	.....	.....	.....	.....	.....	24	.....	.....	.....	400
Sierra Nevada, Nev.	3	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Hill, Nev.	1	100,000	.....	.....	.....	.....	.....	.....	58	.....	.....	.....	.....	.....	100
Tenn., c., Tenn.	25	175,000	28¼	28	28	27½	28¾	28	29	28¾	.....	.....	28½	.....	2,300
Union Con., Nev.	1	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Cop., N. C.	25	.....	1	⅞	⅞	...	¾	.....	¾	.....	.....	.....	⅞	¾	2,200
Uni'd Cop. com., Mont	100	300,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
White Kn'b, g. s., Id'o.	100	450,000	10¾	.....	.....	.....	10½	10½	09½	.....	.....	.....	9	.....	390
Yellow Jacket, Nev.	3	120,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Total sales, 590,697 shares. †Ex-dividend.

COLORADO SPRINGS (By Telegraph).

Name of Company.	Oct. 12 H.	Oct. 12 L.	Oct. 13 H.	Oct. 13 L.	Name of Company.	Oct. 12 H.	Oct. 12 L.	Oct. 13 H.	Oct. 13 L.
Acacia	.07	.06½	.07¼	.06	Isabella	.11	.10½	.10¾	.10½
Am. Con.	.02	.01½	.02	.01½	Jack Pot	.08½	.06	.08¼	.06
Anaconda	.12½	.11	.12½	.10	Keystone	.03⅝	.03¼	.03⅝	.02¾
Blue Bell	.05	.04	.05	.04	Last Dollar	.50	.25	.50	.25
Cripple Creek Con	.04	.03½	.04	.03¾	Lexington	.05¼	.03½	.04	.03½
C. K. & N.	.20½	.20	.21	.20	Little Puck	.03	.02¼	.03	.02¼
Doctor Jack Pot	.09	.08½	.09	.08½	Mollie Gibson	.11	.07½	.11	.05½
Elkton Con	.47½	.46	.46½	.45½	Moon Anchor	.12	.11¾	.12¼	.11¾
El Paso	.61	.58¾	.60	.59⅝	Old Gold	.07½	.07	.07½	.07¼
Findley	.14½	.14¼	.14½	.14¼	Pharmacist	.03½	.02½	.03½	.02½
Gold Dollar Con	.04¼	.04½	04¾	.04½	Pinnacle	.03	.02	.03	.02
Golden Cycle	.67	.64	.67	.64	Portland	1.20	1.00	1.20	1.07
Golden Fleece	.20	.06	.20	.06	Vindicator	.60	.40	.60	.40
Gould	.02	.01	.02	.01	Work	.05¼	.05	.05¼	.05

COLORADO SPRINGS, COLO.*

Name of Company.	Par Val	Shares Listed.	Oct 3 H.	Oct 3 L.	Oct. 5 H.	Oct. 5 L.	Oct. 6 H.	Oct. 6 L.	Oct. 7 H.	Oct. 7 L.	Oct. 9 H.	Oct. 9 L.	Oct. 2 H.	Oct. 2 L.	Sales
Acacia	$1	1,500,000	.07¼	.06	.08	.06	.07¼	.06½	.07½	.06⅝	.07½	.06	.07⅜	.06¾	1,000
Am. Con.	1	2,000,000	.02	.01½	.02	.01½	.02	.01⅝	.02	.01⅝	.02	.01⅝	.02	.01⅝	.....
Anaconda	5	1,000,000	.13¼	.12½	.13½	.12⅝	.13¼	.12¼	.13½	.12½	.13½	.12½	.12¾	.11	2,000
Ben Hur	1	900,000	.02	.01½	.02	.....	.02	.01	.02	.....	.02	.....	.02	.....	.....
Blue Bell	1	1,000,000	.05	.....	.03	.....	.03	.....	.03	.....	.03	.....	.03	.....	.....
C. C. & M.	1	1,000,000	.02½	.02¼	.02½	.02¼	.02½	.02¼	.02½	.02⅜	.02½	.02¼	.02½	.02¼	.....
C. K. & N.	1	1,250,000	.19	.18½	.19¼	.18½	.19½	.18	.20	.19½	.20	.19	.20	.19	13,000
C. C. Con.	1	2,000,000	.04½	.03¾	.04⅝	.03⅜	.04½	.04	.04¼	.03⅞	.03⅞	.....	.04	.03¾	2,000
Coriolanus	1	1,500,000	.02	.....	.02	.....	.02	.....	.02	.....	.02	.....	.02	.....	.....
Des Moines	1	750,000	.03	.....	.03	.....	.03	.....	.03	.....	.03	.....	.03	.....	.....
Dr. Jack Pot	1	.....	.09	.08½	.09	.08¾	.09	.08¾	.09	.08¾	.09	.08½	.09	.08½	1,000
Elkton Con.	1	1,250,000	.48¼	.46½	.48¼	47	.48½	.47	.48¼	.45½	.48	.45½	.47½	.45½	1,500
El Paso	1	800,000	.61	.60½	.61	.60	.60½	.59⅞	.61	.59⅞	.60	.59	.59	...	2,525
Fannie Rawlings	1	1,000,000	.03	.02	.02	.....	.02½	.02	.02⅝	.01⅞	.02½	.01⅞	.....	.....	3,000
Findley	1	1,250,000	.14¼	.14	.14¾	.14	.14¼	.14	.15	.14½	.15	.....	.15	.14	4,000
Gold Bond	1	1,000,000	.01	.....	.01	.....	.01	.....	.01¼	.....	.02	.01	.02	.01	.....
Gold Dollar Con.	1	.....	.04¼	.04¼	.04¼	.04⅜	.04¼	.04	.04¼	.04	.04¼	.04	.04¼	.04	11,000
Golden Cycle	1	2,000,000	.70	.65	.66	.65	.67	.64⅜	.67	.64¼	.65	.64½	.67	.65	3,000
Golden Fleece	1	600,000	.20	.06	.20	.06	.20	.06	.20	.06	.20	.06	.20	.06	.....
Gould	1	1,250,000	.01¼	.007	.01½	.006	.01½	.01	.02	.01	.01⅞	.01	.01½	.01	1,000
Hart	1	1,000,000	.02½	.....	.02½	.....	.02½	.....	.....	.....	.02½	.....	.02½	.....	.....
Isabella	1	2,500,000	.11	.10½	.11	.10½	.11¼	.10⅞	.11	.10⅝	.10⅞	.10½	.11	.10⅝	3,000
Jack Pot	1	1,250,000	.08¼	.02	.08¼	.06	.08½	.02	.08½	.06	.08½	.06	.08¼	.06	.....
Last Dollar	1	1,500,000	.30	.....	.50	.....	.50	.....	.50	.....	.60	.....	.50	.....	.....
Lexington	1	1,500,000	.03½	.....	.03¼	.....	.03⅜	.03⅜	.03¼	.....	.03¼	.....	.03	.....	1,000
Little Puck	1	2,000,000	.03	.02¼	.03	.02¼	.03	.02¼	.03	.02¼	.03	.02¼	.03	.02¼	.....
Mollie Gibson	5	1,000,000	.06	.....	.07½	.06½	.12	.07	.12	.07⅜	.10	.08	.12	.08	800
Moon-Anchor	1	600,000	.12½	.11⅞	.12½	.11¾	.12¼	.11¾	.12½	.12	.12¾	.12	.12½	.10¾	6,600
New Haven	1	1,500,000	.02⅜	.02¼	.02⅜	.02¼	.02⅜	.02¼	.02⅜	.02¼	.02⅝	.02¼	.02⅜	.02¼	.....
Pharmacist, Con	1	1,500,000	.03¼	.03⅛	.03¼	.03⅛	.03⅛	.03	.03¼	.03	.03⅛	.03	.03⅛	.02⅜	9,000
Pinnacle	1	2,000,000	.03	.....	.03	.....	.03	.....	.03	.....	.03	.....	.03	.....	.....
Pointer	1	1,250,000	.01½	.01	.01¾	.01	.01¼	.01	.01⅜	.01	.01⅜	.01	.01¾	.01	.....
Portland	1	3,000,000	1.25	1.10	1.25	1 00	1.25	1.00	1.25	1.10	1.25	110	1.30	1.10	.....
Prince Albert	1	3,000,000	.02¼	.01½	.02¼	.01½	.02¼	.01½	.02¼	.01¾	.02¼	.01½	.02¼	.01½	1,000
Vindicator	1	1,500,000	.85	.....	.85	.....	.85	.....	.85	.....	.85	.....	.85	.....	.....
Work	1	1,500,000	.05¼	.05½	.05¼	.05	.05½	.06	.05⅛	.04⅜	.05⅜	.05½	.05¼	.06	12,000

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 77,425 shares.

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	October 12.	October 13.	Name of Company.	Shares Issued.	October 12.	October 13.
Belcher	104,000	.16	.16	Justice	105,000	.07	.07
Best & Belcher	100,800	1.50	1.45	Mexican	100,800	1.00	1.05
Caledonia	100,000	.91	.93	Occidental Con	100,000	.21	.20
Challenge Con	50,000	.30	.30	Ophir	100,800	1.50	1.50
Chollar	112,000	.22	.23	Overman	115,200	.22	.22
Confidence	24,960	.74	.72	Potosi	112,000	.22	.22
Con. Cal. & Va.	216,000	1.30	1.30	Savage	112,000	.22	.23
Con. Imperial	500,000	.02	.03	Sierra Nevada	100,000	.52	.50
Crown Point	100,000	.18	.20	Union Con	100,000	.63	.62
Gould & Curry	108,000	.20	.20	Utah Con	100,000	.21	.20
Hale & Norcross	112,000	.55	.55	Yellow Jacket	120,000	.40	.43

COAL, IRON AND INDUSTRIAL STOCKS.

Name of Company.	Par val.	Shares Issued.	Oct. 7 H.	Oct. 7 L.	Oct. 8 H.	Oct. 8 L.	Oct 9. H.	Oct 9. L.	Oct. 10 H.	Oct. 10 L.	Oct. 12 H.	Oct. 12 L.	Oct. 13 H.	Oct. 13 L.	Sales
Allis-Chalmers, U. S.	$100	.....	.....	.....	.....	.....	9	.....	.....	.....	.08	.....	.09	.....	500
Allis-Cham's, pf, U. S.	100	200,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Agr. Chem., U. S.	100	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	100
Am. Agr. Chem. pf, U. S.	100	181,350	.....	.....	74	.....	.....	.....	.....	.....	.....	.....	.....	.....	15
Am. Sm. & Ref., U. S.	100	500,000	42⅜	41¼	41¾	40⅜	41¼	39⅝	41	40½	40	39½	41	39¾	87,765
Am. Sm. & Ref., pf, U. S.	100	500,000	88	87½	87¼	.....	87¼	87	87	.....	87	86¼	87	86¾	3,637
Am. Steel & Fdy., U. S.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. S. & Fdy., U. S.	100	155,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Col. Fuel & I., Colo.	.....	.....	41	.....	40	.....	40½	40	40½	38¼	35	33	33	25	6,900
Col. & H. C. & I., Colo.	100	69,244	11	.....	.....	.....	11	.....	.....	.....	10	.....	10	.....	020
†Crucible Steel, U. S.	100	250,000	7¼	7⅛	7	6¾	6¼	5¾	6	5¾	5⅞	5½	5½	5	7,365
†CrucibleSteel, pf, U. S.	100	250,000	58½	57⅝	57⅛	54¼	53	49	49¾	49	49	46	47	35	40,921
†Mong. R. Coal, Pa.	50	200,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9¼	.....	400
†Mong. R. Coal, pf, Pa.	50	98,300	33½	33	..	.....	33	32½	.....	.....	32	.....	31	30	305
National Lead, U. S.	100	149,054	.....	.....	.....	.....	13	.....	.....	.....	12¾	12½	12	.....	1,562
National Lead, pf, U. S.	100	149,040	.....	.....	.....	.....	.....	.....	.....	.....	80½	.....	80	76	1,323
†Phila. Nat. Gas.	100	308,542	.....	.....	37	.....	36	.....	35¾	.....	35½	34½	35⅛	35⅛	610
†Phila. Nat. Gas, pf.	100	212,873	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
†Pittsburg Coal, Pa.	100	300,307	.....	.....	24	22	22	.....	22	21	20	19	19	18¾	6,015
†Pittsburg Coal, pf, Pa.	100	297,012	74	72½	72½	71¼	71	70	71	70½	70	68¾	69	68	2,483
Republic I. & S., U. S.	100	273,520	9	.....	9	.....	8¾	8½	8¾	8½	8	7¼	7⅞	7¼	4,545
Republic I. & S., pf, U. S.	100	203,569	61½	...	61¼	60	58⅜	58	58½	58	57⅝	54⅝	57½	56	13,085
Sloss-Shef S. & I., Ala.	100	75,000	27	.....	.....	.....	25	.....	.....	.....	24½	24	23½	23	600
Sloss-Shef S. & I. pf, Ala.	100	65,085	.....	.....	.....	.....	.....	.....	.....	.....	68	.....	65½	.....	125
Standard Oil, U. S.	100	970,000	6.20	6.15	6.20	6.15	6.17	6.15	6.20	.....	.....	.....	6.28	6.21	205
Tenn. C. I. & R. R.	100	225,000	33¾	31½	31¾	29	29⅜	27½	29⅝	28⅜	28¼	27½	28¾	26⅝	34,039
U. S. Red. & Ref., U. S.	100	59,188	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
U. S. Red & Ref., pf, U. S.	100	39,485	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
‡U. S. Steel Corp., U. S.	100	5,084,962	17½	16⅛	16½	14¾	14⅜	14¼	14⅞	14¼	13⅜	12⅛	13⅛	12⅛	277,748
U. S. Steel Crop. pf, U. S.	100	5,103,141	65¼	64¾	65	62¼	62⅛	61⅜	61⅞	59	59⅜	57⅛	60	57¼	481,372
Va.-Car Chem., U. S.	100	279,844	20	10	10⅞	18½	19	18⅛	17½	.....	18	17½	18⅛	18¼	3,905
Va.-Car Chem., pf, U. S.	100	120,000	.....	.....	.....	.....	.....	.....	.....	.....	88	.....	.....	.....	10
Va. I., Coal & Coke	100	86,416	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

‡Ex-dividend. Total sales 946,761 shares.

BOSTON, MASS.

Name of Company.	Par val	Shares listed	Oct. 7 H.	Oct. 7 L.	Oct. 8 H.	Oct. 8 L.	Oct. 9 H.	Oct. 9 L.	Oct. 10 H.	Oct. 10 L.	Oct. 12 H.	Oct. 12 L.	Oct. 13 H.	Oct. 13 L.	Sales.
Adventure Con., c.	$25	100,000	4	.....	4	3¾	3½	3	3	.....	3½	.....	3½	3	700
Allouez	25	99,511	4⅝	4¼	.....	.....	4½	4¼	4	.....	4	.....	4	.....	545
Amalgamated, c.	100	1,538,879	41½	37⅜	38¼	35¾	36	34¾	37⅛	35½	36⅞	35½	37⅜	36	62,982
Am. Gold Dredging	5	90,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Z. L. & Sm.	25	60,000	7½	.....	7½	.....	.....	.....	.....	.....	.....	.....	.....	.....	300
Anaconda	25	1,200,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arcadian, c.	25	150,000	90	75	80	75	75	.....	80	90	80	.....	80	75	1,400
Arnold	25	60,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Atlantic, c.	25	100,000	7	.....	.....	.....	.....	.....	.....	.....	7	.....	7	.....	110
Bingham Con., g. s.	50	150,000	.....	.....	21½	21	22	.....	.....	.....	21	.....	20½	.....	450
Bonanza	10	300,000	.....	.....	.....	.....	50	.....	.....	.....	50	45	.....	.....	600
Breece	25	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
British Columbia	5	256,800	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2½	.....	40
Cal. & Helca, c.	25	100,000	435	.....	430	.....	435	.....	.....	.....	4.30	.....	4.35	.....	14
Centennial, c.	25	90,000	16	15¼	15¼	15	15	14¾	.....	.....	15	14⅜	15	.....	900
Central Oil	25	60,050	.....	.....	7	.....	.....	.....	.....	.....	.....	.....	7	.....	35
Con. Mercur, g.	5	1,000,000	.....	.....	1¼	1⅛	1¼	.....	.....	.....	.....	.....	1¼	.....	1,105
Copper Range Con.	100	361,750	51	47¾	48½	46	46¼	44	46¾	45½	46	44¼	46⅜	44¼	24,263
†Daly-West,	20	180,000	40	39½	40½	39½	40	39¼	39	.....	39⅜	39	39	.....	562
Dominion Coal	100	150,000	71½	71	70	69	.....	.....	.....	.....	69	67	68	60½	2,290
Dominion Coal, pf.	100	30,000	.....	.....	108	106½	.....	.....	.....	.....	.....	.....	.....	.....	37
Dominion I. & S.	100	100,000	10½	10	10	.....	9½	9	9	.....	8	.....	.....	.....	945
Elm River	12	100,000	.....	.....	.....	.....	2½	2¼	2¼	.....	2½	2¼	.....	.....	200
Franklin, c.	25	100,000	.....	.....	.....	.....	.....	.....	7¾	.....	.....	.....	.....	.....	150
Granby Con.	10	1,336,303	4	.....	4¼	.....	4½	.....	.....	.....	4¼	.....	4¼	.....	1,225
Guanajuato Con.	5	385,000	.....	.....	.....	.....	75	62½	.....	.....	.....	.....	.....	.....	100
Isle Royal Con., c.	25	385,000	.....	.....	.....	.....	.....	.....	5½	.....	5⅜	5½	6	5½	355
Mass Con., C.	25	100,000	5	.....	5	4⅞	5	4½	4⅝	.....	.....	.....	4½	4⅜	307
Mayflower, c.	25	00,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Michigan, c.	25	100,000	.....	.....	.....	.....	.....	6½	.....	.....	6	.....	.....	.....	130
Mohawk, c.	25	100,000	39¼	37½	37½	36	37	36	.....	.....	37	36	35¾	35½	1,386
Mont. Coal & Coke	25	200,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mont'l & Boston, c.	5	570,000	.....	.....	75	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
New Idria	5	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nova Scotia St. & C.	100	37,623	..	.....	73	72	.....	.....	72½	.....	.....	.....	70½	.....	150
Nova Scotia St. & C., pf.	100	10,300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Old Colony, c.	25	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Old Dominion, c.	25	150,000	6¼	5¼	5½	5	5¼	5	6	5⅝	6	5½	5¾	5¼	1,875
Osceola, c.	25	96,150	53	.....	52	51½	52	51½	52½	.....	51¾	51	52	51	695
Parrott, s. c.	10	229,850	18	.....	18	17¼	17	16½	16	.....	.....	.....	17¾	17¼	105
Phœnix Con, c.	25	100,000	.....	.....	5	.....	.....	.....	4⅞	4½	.....	.....	4½	4	150
Quincy, c.	25	100,000	88	.....	88	85	85	.....	85	.....	85	.....	85	.....	127
Rhode Island, c.	25	100,000	.....	.....	.....	.....	1⅛	.....	1⅛	.....	.....	.....	1	.....	100
Santa Fe, g. c.	10	250,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1¼	.....	200
Shannon, c.	10	298,021	10	.....	.....	.....	9½	9	.....	.....	9¼	9	9	.....	695
Tamarack, c.	25	60,000	.....	.....	.....	.....	76	75	.....	.....	.....	.....	.....	.....	75
Tecumseh	25	80,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	25	175,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trinity, c.	25	160,000	6	5¼	5¼	5½	5¾	5¼	5⅛	5¼	5½	5¼	5½	5⅛	1,355
United c.	100	450,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
United States, g.	10	300,000	18	17	17½	17	17⅜	17	17⅜	17	17	16½	17¼	17	5,005
U. S. Coal & Oil	25	240,000

STOCK QUOTATIONS

MEXICO*. Oct. 2

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles..	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos....	2,400	5.00	110	112
Cinco Senores y An., aviadoras	2,000	15.00	150	155
Cinco Senores y An., aviada	400	10.00	135	145
Providencia, San Juan de la Luz	6,000	2.00	100	105
Queensland y Australia	300	.....	75	80
Guerrero:				
Delfina, 1st serie.....	2,500	.....	35	40
Delfina, 2nd serie....	2,500	.....	30	35
Garduno y Anexas...	7,200	.....	40	50
Hidalgo:				
Amistad y Condordia	9,600	8.87	74	77
Carmen, aviada.	1,100	.....	140	160
Guadalupe Fresnillo Mill	1,000	.....	180	250
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora.	1,536	.....	.....	.....
La Blanca, aviada....	768	.....	.....	.....
La Reina y An., aviadora	5,000	.....	20	23
Luz de Maravillas, aviadas	1,100	.....	.....	20
Maravillas y An., aviador	1,680	.....	120	140
Maravillas el Lobo ..	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	.....	.....
Refugio, aviada.....	12,800	.....	7	8
Santa Anay An., aviadora	1,800	.....	30	40
Santa Anay An., aviada	600	.....	30	40
Sta. Gertrudis y An., aviadas	9,600	.....	10	13
Sta. Gertrudis y An., aviadora	28,800	1.00	80	82
Santo Tomas Apostol aviadoras	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	15	18
San Felipe de Jesus, aviada	1,200	.....	6	10
San Rafael y An., Trompillo	1,200	12.00	1,700	1,720
San Rafael y An., aviada	1,200	4.00	720	740
Soledad, aviada.....	960	5.00	730	760
Sorpresa, aviada.....	960	5.00	400	420
.....	.....	.....	.....	.....
Mexico:				
Alacran.....	2,400	.....	2	60
Aldebarren.....	2,000	.....	105	110
Buen Despacho.....	3,000	.....	75	85
Dos Estrellas.....	3,000	30.00	2,950	3,000
La Esperanza (El Oro.).....	3,000	10.00	1,500	1,500
La Reformia, aviadores.....	2,000	.....	75	80
Providencia, pagadoras.....	1,600	.....	.....	.....
Providencia, liberadas.....	900	.....	.....	.....
Santa Ana, Esperanza.....	2,400	.....	90	.....
Michoacan:				
Luz de Borda, aviadora.....	3,000	.....	150	160
Luz de Borda, aviado.....	1,000	.....	60	70
Nuevo Leon:				
La Fraternal.....	1,000	.....	575	625
Norias de Bajan.....	1,000	.....	800	850
Santiago y An., Tlal..	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An.....	3,000	.....	90	95
El Barreno, aviadora.	2,000	2.00	48	50
Sta. Maria de la Paz..	2,400	20.00	790	700
San Diegoy Annexas.	2,400	4.00	12	16
Zacatecas:				
Asturiana y An.....	2,500	.....	75	80
Candelaria y Pinos..	2,500	10.00	160	180
Cubiertas.....	2,400	.....	.....	.....
Esperanza y An.....	2,400	.....	20	25
Lourdes.....	2,500	.....	20	25
Luz de Minillas, pagadoras.....	2,000	.....	20	40
Nueva Quebradilla, aviadoras.....	2,400	.....	95	100
Nueva Quebradilla, aviadas.....	600	.....	70	85
San Carlos y Annexas	2,500	20.00	135	155
Sta. Maria de Gaud..	2,500	10.00	60	70
Miscellaneous:				
Bartolome de Medina	2,000	1.50	70	75
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.).....	3,750	.....	.....	.....
La Reina (Chihuahua.)	192	.....	.....	.....
Naica (Chihuahua.).....	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,040
Natividad (Oaxaca) aviadas.....	600	4.00	.....	.....
San Francisco Hac...	6,000	1.00	70	75
Santa Ana Huantla Morelos.....	4,000	.....	.....	.....
Union Hacienda.....	3,000	5.00	210	246

*Values are in Mexican currency.

TORONTO, ONT. Oct. 10

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail.....	$1	.04	.02	.....
Cariboo (Mc. K.).....	1	.13	.12	.....
Cariboo (Hyd.).....	1	.75	.....	.....
Center Star.....	1	.28	.20	.....
Crows Nest, C.....	100	3.50	2.80	.....
Dominion Coal, com..	100	72.00	68.50	.....
Dominion S. & I.....	100	.10½	.08	.....
Fairview.....	1	.05	.03	.....
Giant.....	1	.03	.02	.....
Deer Trail.....	1	.02½	.01¼	.....
Iron Mask.....	1	.06	.....	.....
Morrison.....	1	04	.02	.....
Granby Smelter.†	$10	4.50	3.90	.....
Mountain Lion.....	1	.28	.20	.....
North Star.....	1	.14	.09	.....
Nova Scotia Steel, com	100	76.00	71.00	.....
Payne	1	.17	.13	.....
Rambler Cariboo.....	1	.40	.30	.....
Republic	1	.03	.01	.....
St. Eugene.....	1	.48	.40	.....
Virtue.....	1	.07	.05	.....
War Eagle Con.....	1	.14	.08½	.....
Sullivan	1	.06	.04	.....
Winnipeg	1	.04	.03½	.....
Wonderful	1	.04	.03½	.....

Total sales,

SALT LAKE CITY.* Oct. 10

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax	10	300,000	.11	.10¼	1,900
Butler Liberal.....			.15¾	.14¾	5,200
Carisa.....	1	300,000	.15½	.15	6,000
Century.....					
Con. Mercur.....	5	1,000,000	1.11½	1.06	12,200
Daly.....	20	150,000	2.22½	2.10	450
Daly-Judge.....	20	300,000	9.00	8.80	205
Daly-West.....	1	150,000	40.25	37.75	388
Grand Central..	1	250,000	4.00	4.00	25
Ingot.....			.02¾	.02¼	4,000
Joe Bowers.....			.01¾	.01¼	37,000
La Reine.....			.03	.03	1,000
Little Chief.....					
L. Mammoth..	20	250,000	.54½	.53½	200
May Day.....	¼	400,000	.08¾	.07½	37,900
Mammoth.....	25	400,000	1.02	1.01½	700
M. Washington	½	300,000	.02⅜	.02¼	10,000
Naildriver.....			1.25	1.25	150
N. Y. Bonanza.			.21¼	.20½	6,300
Northern Light			.00½	.00½	6,000
Petro.....	1	10,000			
Sacramento..	1		.27¼	.27	3,700
Silver King					
Silver Shield...	5	1,000,000	.11¾	.11	2,000
Star Con.....			.37¼	.35½	39,800
Swansea			.40	.30	900
Tetro.....	1	500,000	.30	.29	2,100
Uncle Sam Con.			.25	.24	8,300
Valeo.....					
Victor Con.....	1	500,000	.13½	.12	1,500
Wabash	1	500,000	.08	.06¾	7,950
Yankee Cons...	1	500,000	.48	.45	2,800

*By our Special Correspondent. All mines are in Utah. Total sales, 208,580 shares.

PHILADELPHIA, PA *

Name and Location of Co.	Par val.	Oct. 7 H.	Oct. 7 L.	Oct. 8 H.	Oct. 8 L.	Oct. 9. H.	Oct. 9. L.	Oct. 10. H.	Oct. 10. L.	Oct. 12. H.	Oct. 12. L.	Oct. 13. H.	Oct. 13. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement...	10	.....	.....	6⅝	.....	6⅝	6½	.....	.....	6⅝	6½	6⅝	.....	565
Cambria Iron, Pa	50	45¼	.....	45	.....	45	.....	45	.....	.....	.....	.....	.....	285
Cambria S., Pa.	50	19	.....	19	18½	19	18¾	18¾	.....	18¼	18	18½	18¼	3,965
Penn. Steel, pfd	100	.....	.....	.....	.....	.....	.....	.....	.....	80	.....	.....	.....	2
Susq. I. & S., Pa	5	.....	.....	.....	.....	.....	.....	.....	.....	¾	.....	.....	.....	100
United Gas I. Pa	50	81	80⅜	80⅝	79¾	79⅛	78¾	79¼	79	78¼	76	78¾	77⅛	7,543
Warwick I. & S.	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Diamond Steel.	50	.....	.....	.....	.....	.....	.....	⅝	.....	.....	.....	.....	.....	50
Lehigh Navig'n	50	65	.....	.....	.....	.....	.....	.....	.....	.....	.....	64	.....	142
Philadelphia.....	50	37⅛	37	37¼	36⅛	36⅛	35⅝	36¼	36	35⅛	35	35¾	35	5,397
U. S. Steel.....	100	17½	16¼	16⅛	15	14⅞	14⅝	14¾	14⅜	13⅞	12⅝	13½	12⅝	39,308
U. S. Steel, pf..	100	65⅛	35	64¼	62⅝	62	61⅝	60¾	59½	59¼	58¼	59¼	57⅝	2,370

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 59,827

LONDON. Oct. 25

Name and Country of Company.	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date.	Quotations. Buyers. £ s. d.	Quotations. Sellers. £ s. d.
Alaska-Treadwell, g., Alaska.....	200,000	5 0 0	3 0	July, 1903	4 0 0	4 5 0
Anaconda, c. s., Montana.....	1,200,000	5 0 0	2 0	May, 1903	3 12 6	3 15 0
Arizona, c., Def., ord.	63,444	1 0 0	5 6	Aug., 1903	6 5 0	6 15 0
Arizona, pref., ord.....	316,350	1 0 0	5 6	Aug., 1903	6 18 9	7 1 3
Camp Bird, g., Colorado.....	738,000	1 0 0	.. 9	Sept. 1903	1 5 0	1 6 3
Central Chile, C., Chile.....	276,248	1 0 0	.. 6	Jan., 1902	3 0	4 0
Copiapo, c., Chile.....	112,500	2 0 0	6 10	May, 1903	1 7 6	1 12 6
De Lamar, g. s., Idaho.....	80,000	1 0 0	2 0	Nov., 1902	11 3	13 9
El Oro, g., Mexico.....	1,000,000	1 0 0	1 6	July, 1903	1 10 0	1 12 6
Frontino & Bolivia, g., Columbia.....	128,682	1 0 0	3 0	July, 1901	7 6	12 6
Le Roi, g., British Col.....	200,000	5 0 0	5 0	Nov., 1899	11 3	13 9
Le Roi No. 2, g., British Col.....	120,000	5 0 0	5 0	May, 1902	17 6	1 0 0
Mesquital, Mexico.....	250,000	2 0	3	Feb., 1903	1 6	2 6
Montana, g. s., Montana.....	657,128	1 0 0	6	April 1899	1 9	2 3
Mountain, c., Cal.	250,000	5 0 0	2 4	May. 1903	2 17 6	3 2 6
Stratton's Independence, Colorado...	1,000,007	1 0 0	1 0	Aug., 1903	5 0	5 6
St. John del Rey., g., Brazil.....	546,265	1 0 0	8	June, 1903	15 0	16 0
Utah Con., g . c. (Highland Boy), Utah	300,000	1 0 0	6 3	July, 1903	4 15 0	5 5 0
Ymir, g., British Col.....	200,000	1 0 0	1 0	Mar., 1902	5 0	7 6
European :						
Linares, l., Spain.....	15,000	3 0 0	1 0	Mar., 1903	2 5 0	2 15 0
Mason & Barry, c., sul., Port'g'l.....	185,172	1 0 0	11 0	May, 1903	3 7 6	3 12 6
Rio Tinto, c., Spain.....	325,000	5 0 0	27 6	May, 1903	47 5 0	47 10 0
Rio Tinto, pref., Spain.....	325,000	5 0 0	2 6	May, 1903	6 2 6	6 7 6
Tharsis, c., Spain.....	625,000	2 0 0	6 0	May, 1903	4 0 0	4 5 0
Australia and New Zealand :						
Assoc. Gold Mines, W. Australia.....	495,388	1 0 0	2 0	July, 1903	2 5 0	2 6 3
Briseis, Tin, Tasmania.....	600,000	1 0 0	.....	.....	4 3	4 9
Broken Hill Pr'p, s., N. S. Wales.....	960,000	8 0	1 0	Aug., 1903	1 9 0	1 10 0
Cosmopolitan Prop., W. Australia.....	385,000	1 0 0	1 0	May, 1903	14 6	15 6
Golden Horse Shoe, W. Australia.....	300,000	5 0 0	6 0	Apr., 1903	8 1 3	8 3 9
Great Fingall Con., W. Australia.....	250,000	1 0 0	6 0	Oct., 1903	8 15 0	8 17 6
Great Bo'd'r Pr'p, W. Australia.....	1,750,000	2 0	9	Sept. 1903	1 6 6	1 7 6
Ivanhoe Gold Corp., W. Australia.....	200,000	5 0 0	5 0	Oct., 1903	8 5 0	8 7 6
Kalgurli, g., W. Australia.....	120,000	1 0 0	2 6	Oct., 1903	4 6 3	4 8 9
Lake View Cons., g., W. Australia...	250,000	1 0 0	rts.	Aug., 1902	1 13 9	1 15 0
Mt. Lyell M. & R. I., c., Tasmania....	275,000	3 0 0	4 3	Sept., 1903	2 13 9	2 16 3
Mt. Morgan, g., Queensland.....	1,000,000	1 0 0	3	Oct., 1903	2 17 6	3 0 0
Waihi, g., New Zealand.....	497,412	1 0 0	2 6	June, 1903	5 2 6	5 5 0
Indian:						
Champion Reef, g., Colar Fields.....	473,000	10 0	5 6	Aug., 1903	7 7 6	7 10 0
Mysore Gold, Colar Fields.....	568,043	10 0	4 0	July, 1903	6 13 9	6 18 9
Nundydroog, g., Colar Fields.....	484,000	10 0	1 6	Mar., 1903	2 6 3	2 8 9
Ooregum, g., Colar Fields.....	343,000	10 0	1 9	Aug., 1903	1 11 3	1 13 9
Ooregum, g., pref., g., Colar Fields...	240,000	10 0	1 9	Aug., 1903	2 0 0	2 2 6
African :						
Angelo, g., Transvaal.....	600,000	1 0 0	6 0	Aug., 1903	6 7 6	6 12 6
Bonanza, g., Transvaal.....	200,000	1 0 0	10 0	Aug., 1903	3 0 0	3 2 6
British South Africa...	4,436,019	1 0 0	rts.	May. 1889	2 6 3	2 7 6
Cape Copper, S. Africa.....	300,000	2 0 0	1 0	July, 1903	2 8 9	2 11 3
Cape Copper, pref., S. Africa.....	75,000	2 0 0	1 0	July, 1903	2 10 0	2 15 0
City and Sub'n (New), g., Transvaal..	340,000	4 0 0	4 0	Aug., 1903	5 10 0	5 15 0
Crown Reef, g., Transvaal.....	120,000	1 0 0	4 0	Oct., 1903	17 15 0	18 5 0
De Beers Con., d., pref., Cape Colony.	800,000	2 10 0	10 0	Aug., 1903	18 16 3	18 18 9
De Beers Con., def.....	1,000,000	2 10 0	15 0	Aug., 1903	19 6 3	19 8 9
East Rand, Prop., Transvaal.....	970,000	1 0 0	5 0	Aug., 1903	6 17 6	7 0 0
Ferreira, g., Transvaal.....	90,000	1 0 0	15 0	Aug., 1903	19 0 0	19 10 0
Geldenhuis Est., g., Transvaal.....	200,000	1 0 0	6 0	Aug., 1903	6 0 0	6 2 6
Geduld, g., Transvaal.....	400,000	1 0 0	rts.	Mar., 1902	6 0 0	6 2 6
Henry Nourse, g., Transvaal.....	125,000	1 0 0	10 0	Aug., 1903	7 17 6	8 2 6
Jagersfontein, d., Orange, F. S.....	200,000	5 0 0	6 0	Nov., 1889	28 12 6	28 17 6
Jubilee, g., Transvaal.....	50,000	1 0 0	5 0	July, 1903	4 12 6	4 17 6
Jumpers, Transvaal.....	100,000	1 0 0	5 0	Aug., 1899	3 2 6	3 7 6
Langlaagte Est., g., Transvaal.....	470,000	1 0 0	3 0	Aug., 1903	3 11 3	3 13 9
May Con., g., Transvaal.....	288,750	1 0 0	3 0	Aug., 1903	3 18 9	4 1 3
Meyer & Charlton, g., Transvaal.....	100,000	1 0 0	3 0	Aug., 1903	5 0 0	5 5 0
Modderfontein, g., Transvaal.....	290,000	1 0 0	rts.	Apr., 1902	8 11 3	8 13 9
Namaqua, c., Cape Colony.....	94,331	2 0 0	2 0	June, 1903	3 0 0	3 5 0
Primrose (New), g., Transvaal.....	325,000	1 0 0	2 0	Aug., 1903	3 12 6	3 13 9
Rand Mines, g., S. Africa.....	1,795,856	5 0	4 0	Aug., 1902	9 0 0	9 1 3
Robinson, g., Transvaal.....	750,000	5 0 0	5 6	Aug., 1903	9 13 9	9 16 3
Robinson Deep, g., Transvaal.....	950,000	1 0 0	2 0	Aug., 1903	4 15 0	4 17 6
Rose Deep, Transvaal.....	425,000	1 0 0	2 0	Aug., 1903	7 10 0	7 15 0
Salisbury, g., Transvaal.....	100,000	1 0 0	2 0	Mar , 1899	1 17 6	2 2 6
Sheba, g., Transvaal.....	1,075,000	1 0 0	6	July, 1599	12 0	13 0
Village Main Reef, Transvaal.....	400,000	1 0 0	4 0	June, 1903	7 7 6	7 12 6
Wemmer, Transvaal.....	80,000	1 0 0	10 0	July, 1903	10 0 0	10 10 0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-dividend.

LONDON (By Cable.)*

Name of Company.	Oct. 6. £. s. d.	Oct. 13. £. s. d.	Name of Company.	Oct. 6. £. s. d.	Oct. 13. £. s. d.
Anaconda.....	3 10 0	3 7 6	Jagersfontein.....	28 10 0	28 5 0
British South Africa.....	2 5 0	2 5 0	Johannesburg Invest....	2 15 0	2 12 6
Camp Bird.....	1 5 0	1 5 0	Modderfontein.....	8 4 4½	7 17 6
Con. Gold Fields.....	5 7 6	5 3 9	Rand Mines.....	8 12 6	8 13 9
De Beers Con. def.....	19 5 0	19 2 6	Rio Tinto, com.....	47 15 0	47 17 6
East Rand.....	6 12 6	6 9 4½	Simmer & Jack.....	1 6 3	1 4 4½
El Oro, Mex.....	1 9 4½	1 6 10½	Tomboy.....	1 8 1½	1 7 6

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Sept. 17

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Alameda.....	California ...	Oil.....	1,000,000	1	9.50	8.00	7.50
Auzin	France	Coal	.....	.....	290.00	5,750.00	5,750.00
Boleo.....	Lower Cal....	Copper.....	.....	500	176.00	1,405.00	1,365.00
Canadian Am.....	Can	Coal.....	.....	20	.....	31.50	29.75
Champ d'Or.....	S. Africa.....	Gold.....	3,375,000	25	3.75	20.50	20.50
Courrieres	France	Coal	600,000	300	110.00	2,990.00	2,995.00
Fraser River.....	Brit. Col'mb..	Gold.....	250,000	25	.....	5.50	5.50
Huanchaca.....	Bolivia.....	Silver.....	40,000,000	125	5.00	90.75	89.00
Laurium.....	Greece.....	Zinc, Lead....	16,300,000	500	25.00	369.00	365.00
Malfidano.....	Italy	Zinc	12,500,000	500	50.00	573.00	570.00
Metaux, Cie. Fran. de.....	France	Metal dealers.	25,000,000	500	22.50	495.00	490.00
Mokta-el-Hadid.....	Algeria	Iron	18,312,000	500	40.00	847.00	833.00
Nickel.....	N. Caled'nia..	Nickel.....	15,000,000	250	22.50	470.00	472.50
Sedalia & California.....	Calif., U. S....	Oil.....	1,000,000	1	.....	6.50	6.50
Vielle Montagne.....	Belgium.....	Zinc.....	9,000,000	30	30.00	682.00	682.00
Wyoming	California.....	Oil	.....	25	.....	294.00	294.00

ST. LOUIS, MO.* Oct. 10.

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.	Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo....	$10	300,000	$0.30	$0.35	Columbia Lead, Mo.	$10	50,000	$3.00	$3.50
Catherine Lead, Mo.	10	50,000	1.50	2.25	Con. Coal, Ill.....	100	50,000	21.00	23.00
Central Coal & C....	100	51,250	56.00	57.00	Doe Run Lead Co..	100	15,000	110.00	115.00
Central C. & C., pf..	100	18,750	68.00	70.00	Granite Bimet. Mt..	10	100,000	.40	.50
Central Lead, Mo...	10	100,000	120.00	130.00	St. Joe Lead, Mo,...	10	600,000	16.00	17.00

*By our Special Correspondent.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust. Meas.	Price.
ABRASIVES—		
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.	$0.08
Grains	"	.10
Corundum, N. C.	"	.07@.10
Chester, Mass.	"	.04½@.05
Barry's Bay, Ont.	"	.07½@.09½
Mont. car-lots, f.o.b. Chicago	"	.07@.07½
Crushed Steel, f.o.b. Pittsburg	"	.05½
Emery, Turkish flour in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Naxos flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Chester flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"	.01½
Grains, in kegs	"	.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton	26.50@30.00
Kuluk (Turkey),	"	22.00@24.00
Naxos (Greek) h. gr.	"	26.00
Garnet, as per quality	sh. ton	25.00@35.00
Pumice Stone, Am. Powd.	lb.	.01½@.02
Italian, powdered	"	.01½
Lump, per quality	"	.04@.40
Rottenstone, ground	"	.02½@.04½
Lump, per quality	"	.06@.20
Rouge, per quality	"	.10@.30
Steel Emery, f.o.b. Pittsburg	"	.07
ACIDS—		
Boracic, crystals	"	.10¾@.11
Powdered	"	.11¼@.11½
Carbonic, liquid gas	"	.12½
Chromic, crude	"	.20
Hydrofluoric, 30%	"	.03
48%	"	.05
60%	"	.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"	.06
ALCOHOL—Grain	gal.	2.39@2.40
Refined wood, 95@97%	"	.50@.55
Purified	"	1.25@1.30
ALUM—Lump	100 lbs.	1.75
Ground	"	1.85
Porous	"	1.00
Powdered	"	3.00
Chrome, com'l	"	2.75@3.00
ALUMINUM—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, com'l	"	1.25@1.50
AMMONIA—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.05½
AMMONIUM—		
Carbonate, lump	"	.07½
Powdered	"	.08¼
Muriate	"	.05⅝
Lump	"	.09
Nitrate, white pure (99%)	"	.12
Phosphate, com'l	"	.09
Pure	"	.12
ANTIMONY—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾@.07¾
Oxide, com'l white, 95%	"	.09½
Com'l white, 95%	"	.12
Com'l gray	"	.07
Sulphuret, com'l	"	.16
ARSENIC—White powd.	"	.029 @.03¼
Red	"	.06⅜@.06½
ASPHALTUM—		
Ventura, Cal.	sh. ton	32.00
Cuban	lb.	.01½@.03½
Egyptian, crude	"	.05½@.06
Trinidad, refined	sh. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic	sh. ton	21.00
Gilsonite, Utah, ordinary	lb.	.03
Select	"	.03¾
BARIUM—		
Carb. Lump, 80@90%	sh. ton	25.00@27.00
92@98%	"	28.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.67½@1.76
Chem. pure cryst.	lb.	.05
Nitrate, powdered	"	.05⅞
BARIUM	Cust. Meas.	Price.
Sulphate (Blanc Fixe)	lb.	$0.02
BARYTES—		
Am. Crude, No. 1	sh. ton	9.50
Crude, No. 2	"	8.00
Crude, No. 3	"	7.00
Floated	"	18.50
Foreign gray	"	13.50
Snow white	"	17.00
Floated	"	18.00
BAUXITE—Ga. or Ala. Mines:		
First grade	lg. ton	5.50
Second grade	"	4.75
BISMUTH—Subnitrate	lb.	2.00
Subcarbonate	"	2.25
BITUMEN—"B"	"	.03½
"A"	"	.05
BONE ASH	"	.02¼@.02½
BORAX	"	.07¼@.07½
BROMINE—Bulk	"	.48
CADMIUM—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50
CALCIUM—Acetate, gray	"	1.40
" brown	"	.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton	70.00
Carbonate, ppt.	lb.	.05
Chloride	100 lbs.	.70@.90
CEMENT—		
Portland, Am., 400 lbs.	bbl.	1.60@1.85
Foreign	"	1.95@2.50
"Rosendale," 300 lbs.	"	.80
Slag cement,	"	1.50@1.60
CERESINE—		
Orange and Yellow	lb.	.13
White	"	.14
CHALK—Lump, bulk	sh. ton	3.00
Ppt. per quality	lb.	.04@.05¼
CHLORINE—Liquid	"	.80
Water	"	.10
CHROME ORE		
(50% ch.) ex-ship N. Y.	lg. ton	24.75
Bricks f.o.b. Pittsburg	M	175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton	8.25
Am. best, ex-dock, N. Y.	"	9.25
English, common	"	10.50
Best grade	"	16.25
Fire Clay, ordinary	sh. ton	4.25
Best	"	6.00
Slip Clay	"	5.00
COAL TAR PITCH	gal.	.08
COBALT—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide—Black	"	2.26@2.30
Gray	"	2.28@2.40
Smalt, blue ordinary	"	.06
Best	"	.20
COPPERAS—Bulk	100 lbs.	.47½
In bbls.	"	.52½
COPPER—Carbonate	lb.	.18@.19
Chloride	"	.25
Nitrate, crystals	"	.35
Oxide, com'l	"	.19
CRYOLITE	"	.06½
EXPLOSIVES—		
Blasting powder, A	25-lb. keg	.65
Blasting powder, B	"	1.40
"Rackarock," A	lb.	.25
"Rackarock," B	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine)	"	.15
(50% nitro-glycerine)	"	.16½
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	.21
Glycerine for ultro (32-2-10° Be.)	"	.12½@.12⅝
FELDSPAR—Ground	sh. ton	8.00@9.00
FLINT PEBBLES—Dan. Best.	lg. ton	14.75
French, Best	"	11.75
FLOURSPAR—		
Am. lump, 1st grade	sh. ton	14.40
2d grade	"	13.90
Gravel and crushed, 1st gr.	"	13.40
2d grade	"	12.40
Ground, 1st grade	"	17.30
Ground, 2d grade	"	16.50
Foreign, lump	"	8.00@12.00
Ground	"	11.50@14.00
FULLER'S EARTH—Lump	100 lbs.	.80
Powdered	"	.85
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton	$8.00
Pulverized	"	30.00
Am. pulv., other than R. I., f. o. b., New York	"	45.00
Best flake	"	150.00
German, com. pulv.	lb.	.01¼@.01½
Best pulverized	"	.01½@.02
Ceylon, common pulv.	"	.02¾@.03½
Best pulverized	"	.04@.08
Italian, pulv	"	.01¼
GYPSUM—Ground	sh. ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg. ton	4.00
English and French	"	14.00@16.00
INFUSORIAL EARTH—Gr'd.		
American best	"	20.00
French	"	37.50
German	"	40.00
IODINE—Crude	100 lbs.	2.45
IRON—Muriate	lb.	.05
Nitrate, com'l	"	.01¼
True	"	.04
Oxide, pure copperas color	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@.03
KAOLIN—(See China Clay.)		
KRYOLITH—(See Cryolite.)		
LEAD—Acetate, white	"	.06¼@.06½
Brown	"	.06¼@.06½
Nitrate, com'l	"	.06½
" gran	"	.08¼
LIME—Com., abt. 250 lbs.	bbl.	.82
Finishing	"	1.02
MAGNESITE—Greece.		
Crude (95%)	lg. ton	5.50@6.00
Calcined	sh. ton	15.50
Bricks, best imp., f.o.b. N.Y.	M.	155.00
" domes., per qual., f.o.b. Pittsburg	"	160.00@200.00
MAGNESIUM—		
Carbonate, light, fine pd.	lb.	.05
Blocks	"	.07@.09
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95
MANGANESE—		
Crude powd.		
70@75% binoxide	lb.	.01¼@.01½
75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore, Foreign	unit	.22@.24
Domestic, 1st quality	"	.30
MARBLE—Flour	sh. ton	6.00@7.00
MERCURY—Bichloride	lb.	.77
MICA—N. Y. gr'nd, coarse	sh. ton	33.00@38.00
Fine	lb.	.00⅝@.02
Sheets are sold as to size and quality.		
MINERAL WOOL—		
Slag, ordinary	sh. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
NICKEL Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21
OILS—Black, reduced 20 gr.:		
25@30, cold test	gal.	.13@.13½
15, cold test	"	.14@.14½
Zero	"	.18½@.19
Summer	"	.13@.13½
Cylinder, dark steam ref.	"	.14½@.15½
Dark, filtered	"	.18½@.19
Light, filtered	"	.20½@.21
Extra cold test	"	.25@.31
Gasoline, 86°@90°	"	.17@.22
Naphtha, crude, 68°@72°	bbl.	12.40
"Stove"	gal.	.15
Linseed, domestic raw	"	.37@.39
Boiled	"	.40
Calcutta, raw	"	.65
OZOKERITE	lb.	.11½
PAINTS AND COLORS—		
Chrome green, common	"	.03
Pure	"	.16
Yellow, common	"	.10¼
Best	"	.14
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. pow'd	"	.05⅝@.06
English flake	"	.08¼@.08½
Glassmakers'	"	.06½@.08¼
PAINTS AND COLORS—	Cust. Meas.	Price.
Metallic, brown	sh. ton	$12.00
Red	"	15.00
Ocher, Am. common	"	9.25@10.00
Best	"	21.25@25.00
Dutch, washed	lb.	.04¾
French, washed	"	.01½@.01¾
Orange mineral, Am.	"	.02
Foreign, as to make	"	.03½@.10¼
Paris green, pure, bulk	"	.11¼
Red lead, American	"	.06½@.06¾
Foreign	"	.06⅝@.06¾
Turpentine, spirits	gal.	.61½@.62
White lead, Am., dry	lb.	.05½@.05¾
American, in oil	"	.07@.08
Foreign, in oil	"	.07@.07¼
Zinc, white, Am., ex. dry	"	.04½@.04¾
Foreign, red seal, dry	"	.06@.06¼
Green seal, dry	"	.06¼@.06½
POTASH—		
Caustic, ordinary	"	.04¼@.04½
Elect. (90%)	"	.06¼
POTASSIUM—		
Bicarbonate cryst.	"	.08¼
Powdered or gran.	"	.14
Bichromate, Am	"	.06½@.06¾
Scotch	"	.06¼@.06
Bromide	"	@.20
Carbonate (80@85%)	"	.03¼@.04½
Chlorate, powd.	"	.06¾@.07¼
Crystals	"	.06¼@.07
Chromate	"	.35
Cyanide (98@99%)	"	.20
Kainit	lg. ton	9.50
Manure salt, 20%	100 lbs.	.66
D'le Manure Salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.20
95%	"	1.36
Permanganate	lb.	.09¼@.09½
Prussiate, yellow	"	.14@.14½
Red	"	.36
Sulphate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvanit	unit	.41
QUARTZ—(See Silica).		
SALT—N. Y. com. fine 280 lbs	bbl.	.72@1.12
N. Y. agricultural	sh. ton	4.40
SALTPETRE—Crude	100 lbs.	3.40
Refined	"	4.00@4.50
SILICA—Best foreign	lg. ton	10.00@11.00
Ground quartz, ord.	sh. ton	6.00@8.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75
SILVER—Chloride	oz.	.48
Nitrate Crystals	"	.38¼
Oxide	"	.85@1.10
SODIUM—		
Bicarb., ord., bulk f.o.b. wk's.	100 lbs.	1.25
Extra domes., f.o.b. w'ks.	"	3.50
Foreign, f.o.b. N. Y.	"	1.00
Bichromate	lb.	.06¾
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.	.75@.80
Foreign, f.ob. N. Y.	"	.90@.92½
Caustic, 70@76% f.o.b. w'ks.	"	1.75@1.80
" 60%	"	1.85@1.90
Foreign, f.o.b N. Y.	"	1.90@2.00
Chlorate, com'l	"	.07@.07¼
Hyposulphite, Am.	"	1.60@1.85
German	"	1.70@1.90
Nitrate, spot	"	2.25
Shipments	"	2@2.05
Peroxide	lb.	.45
Phosphate	"	.02½@.02¾
Prussiate	"	.09¾
Sal soda, f.o.b. works	100 lbs.	.60
Foreign, f.o.b. N. Y.	"	.67½
Silicate, conc.	lb.	.05
Com'l	"	.01
Sulphate, com'l	100 lbs.	.82½
Sulphide	lb.	.01⅞
Sulphite crystals	"	.02½
SULPHUR—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.25
TALC—N. C., 1st grade	sh. ton	20.00
N. Y., Fibrous, best	"	10.28
French, best	100 lbs.	2.00
Italian, best	"	2.25
TAR—Regular	bbl.	2.70
Oil, bbl.	"	4.70
TIN—Crystals	lb.	.22½@.23
Oxide	"	.45
URANIUM—Oxide	"	2.25@3.00
ZINC—Metallic, ch. pure	"	.07@.09½
Carbonate, ppt.	"	.09
Chloride solution, com'l	"	.02¾
Chloride granular	"	.15
Dust	"	.04¾@.04½
Sulphate	"	.02¾@.03¾

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.80
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	15.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	20.00
LITHIUM—Carbonate	"	1.25
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07½@.08½
THORIUM—Nitrate 49@50%	"	4.50
URANIUM—Nitrate	oz.	.25
YTTRIUM—Nitrate	lb.	40.00
ZIRCONIUM—Nitrate	"	3.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.